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Nigerian Ornithologists' Society

BULLETIN

Vol. 14 No. 45 May 1978

THE NIGERIAN ORNITHOLOGISTS' SOCIETY

President : J.H.Elgood

Honorary Secretary and Treasurer : R.E.Sharland

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- to the Hon. Treasurer (c/o Nigerian Oil Mills Ltd.,P.O.Box 342, Kano, Nigeria) regarding subscriptions and financial matters
- to Prof. B.J.Harris (Department of Biological Sciences, Ahmadu Bello University, Zaria, Nigeria) regarding purchase of back numbers of the Bulletin, and all other matters

The Society was formed in 1964 to link bird observers in Nigeria in the furtherance of the country's ornithology through the publication of the BULLETIN. Applications for membership are welcomed. Annual membership subscription rates (1978) are ₦2.50 or £2.00 for Ordinary Members and ₦6.00 or £5.00 for Corporate Members. Members receive the Bulletin free of charge.

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Nigerian Ornithologists' Society Bulletin

Vol. 14 No. 45, May 1978

THE WEST AFRICAN ORNITHOLOGICAL SOCIETY As intimated briefly on p.85 of the last Volume of the Bulletin, the Nigerian Ornithologists' Society is to become the West African Ornithological Society. Proposed amendments to the Constitution necessitated by this change (and a proposal affecting Committee composition) are published herewith, and in accordance with Rule V (Change of Rules) will come into effect after six months.

THE NEW NAME A number of suggestions were sent in response to our invitation, and a choice had to be made from such offers as Balearica, Picathartes, Malimbus, Bateleur, Jacana, Bubalornis, Pelican and Drongo, a plethora of bird names some of which are preoccupied. Balearica, the Crowned Crane that has symbolised the Nigerian Ornithologists' Society for seventeen years, is unfortunately such a one - there is already a provincial Spanish journal of that name. We have actually found over 50 journals having generic or English bird names, which limited our choice to a surprising extent. Some suggestions were most ingenious. Bubalornis is 'a sort of anagram' of Bull. Nig. Orn. Soc., and another offer, Waso, is an anagram of W.A.O.S and should be pronounced 'Oiseaux' ! Eventually unanimity was reached with

MALIMBUS ,

that fine genus of ten species, all of which are found in West Africa as defined by Bannerman. Nine range west of Cameroun and two are endemic to Upper Guinea, so _Malimbus_ is a thoroughly West African genus of birds ; and the name is appropriate also since it was the Society's President who discovered and described _Malimbus ibadanensis_. "Malimbus" was of course John Elgood's proposal; but I can parry any charge of prejudice in our selection of the journal's title by noting that it was suggested by other people too! "Malimbus" has the further merit of internationality : it is the systematic and also the colloquial English and French name (Malimbe).

AMENDMENTS TO THE CONSTITUTION (See Vol. 11, 1975, pp. 45-47)

Amendment (1)

Title

The Society shall be named the WEST AFRICAN ORNITHOLOGICAL SOCIETY and the SOCIÉTÉ D'ORNITHOLOGIE DE L'OUEST AFRICAIN.

Amendment (2)

Objects

The objects of the Society shall be the promotion of scientific interest in birds, and the publication of observations and studies relating to ornithology, particularly of West African from Senegal to Cameroun.

Amendment (3)

Rules para. I (1)

The affairs of the Society shall be managed by a Council of five members elected to the following offices and responsible for all matters of general policy and finance except editorial policy of the Society's journal (MALIMBUS) :

(a) President
(b) Vice-President
(c) Honorary Secretary
(d) Honorary Treasurer and Membership Secretary
(e) Managing Editor of the journal.

Amendment (4)

'Bulletin' to read 'journal' throughout, namely Rules I (2), II (1), II (3), IV title, IV (1), IV (2), IV (3), IV (4) and IV (5).

Amendment (5)

'Nigeria' to read 'West Africa' throughout, i.e. Rules I (3)(b) and I (4).

Amendment (6)

Rules para. IV (2)

Editorial policy shall be outlined from time to time in the pages of the journal. Papers will be accepted for publication in English and in French. Instructions to contributors shall be published bilingually in every Volume of the journal.

Amendment (7)

'Committee' to read 'Council' throughout, namely Rules I (1), I (2), I (4), I (5), II (2), II (4), IV (1), IV (3), IV (5) and V.

ELECTION OF COMMITTEE (TRIENNIUM 1978-1981)

The existing Committee's nominations are : President - Prof. Brian Harris, Vice-President - Dr Gérard Morel, Hon. Secretary - Prof. John Elgood, Hon. Treasurer & Membership Secretary - Mr Bob Sharland, Managing Editor - Dr Hilary Fry. Any other seconded nominations should be sent to the Hon. Secretary.

RECEIPTS AND PAYMENTS ACCOUNT for year ended 31st December 1977

Balance in hand 1st January 1977 ...		£60.29
Subscriptions received ...		232.12
Subsidy from Ahmadu Bello University Press ...		87.00
		379.41
Repayment of President's loan ...	100.00	
Printing and postage ...	227.00	327.00
Balance in hand 31st December 1977 ...		52.41

Application to Ahmadu Bello University Press for subsidy 1977

Printing and postage as above ...	227.00	
Printing due ...	210.00	437.00
Less subscriptions feceived as above ...		232.00
		£205.00
Subsidy requested ...	₦241.00	

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THE STATUS OF SOME NORTHERN GUINEA SAVANNA BIRDS IN MOLE NATIONAL PARK, GHANA

by I. R. Taylor and M. A. Macdonald

Received 29 July 1977

A list of birds recorded at Mole National Park has been compiled by Greig-Smith (1976) and observations on the migratory status of a number of the species have been published by the same author (Greig-Smith 1977). In this note we add a number of new species to the area and comment on the status of several others. One of us (I.R.T.) spent three months at Mole in the wet season of 1969, initiated the training of park staff in bird identification, and introduced the regular censuses which formed the basis of Greig-Smith's conclusions on migratory status. Both of us visited the Park at the end of the dry season in April 1976 before the first rains, and we spent about 50 hours mist-netting and observing in the field, covering all the major habitats within the reserve. There is no other published information for the area during the late dry season. Many of our conclusions on the migratory status of the birds differ from Greig-Smith's, because of his paucity of data for the late dry season.

ADDITIONS TO THE PARK LIST

BLACK KITE Milvus migrans One on 5 April with a very pale head and black bill was probably the Palaearctic race M. m. migrans.

LANNER FALCON Falco biarmicus One on 9 April.

HOBBY F. subbuteo One seen very well on 6 April.

PAINTED SNIPE Rostratula benghalensis A male caught on 8 April and two seen on 9 April.

ROSE-GREY DOVE Streptopelia rosogrisea Two seen well on 5 April.

EUROPEAN ROLLER Coracias garrulus One on 6 April.

HOOPOE Upupa epops At least one bird in a group of six seen on 7 April had the white subterminal bars on the crest characteristic of the Palaearctic U. e. epops (the occurrence of which was queried by Greig-Smith 1977).

AFRICAN SAND MARTIN Riparia paludicola Three seen on 3 and one on 4 April.

GREY-RUMPED SWALLOW *Hirundo griseopyga* A few scattered flocks, probably 50-100 individuals in all. One bird mist-netted. Recorded between 4 and 9 April. This also seems to be the first published record for the species in Ghana.

RED-THROATED PIPIT *Anthus cervinus* Two seen and heard flying over on 5 April.

ICTERINE WARBLER *Hippolais icterina* One *Hippolais* warbler seen well on the 4 of April was almost certainly this species.

GREY-BACKED EREMOMELA *Eremomela icteropygialis* Single birds seen on 3 and 4 April.

SPOTTED FLYCATCHER *Muscicapa striata* Two birds seen on the 7 and 8 April had the small size and faint streaking on the head and breast characteristic of the African race, *M. s. gambagae*.

MIGRATION OF ETHIOPIAN SPECIES

SPUR-WINGED GOOSE *Plectropterus gambensis* This species was seen regularly in small numbers in the wet season but not at all at the end of the dry season, suggesting possible migration.

STONE-PARTRIDGE *Ptilopachus petrosus* Greig-Smith gave this as a resident species and in Nigeria Elgood, Fry and Dowsett (1973) could find no evidence for movements. We did not record any at the end of the dry season although they were common in small groups in the wet season, suggesting the possibility of at least a local movement.

VINACEOUS DOVE *Streptopelia vinacea* Elgood *et al*. could not find conclusive evidence for migration in Nigeria. We confirm the dry season influx noted by Greig-Smith. The species was not common in the park during the wet season but was probably the commonest species during the dry season. At the beginning of April we noted vast flocks starting at about 100 km south of the park (8°30'N).

MOURNING DOVE *Streptopelia decipiens* This is a rather uncommon species in the wet season but we failed to find any at the end of the dry season. More intensive observations might show the species to be migratory, although Elgood *et al*. could find no evidence of migration in Nigeria.

RED-BILLED WOOD DOVE *Turtur afer* Seen in small numbers in the wet season but not seen late in the dry season. In southern Ghana this species prefers wetter habitats than its congener *T. abyssinicus*, and it is probable that it moves south as the dry season progresses.

PYGMY KINGFISHER Ceyx picta Classed by Greig-Smith as resident. It was common in the wet season but we did not see it at the end of the dry season. Around Accra in the dry season one of us has observed an influx of this species into gardens and parklands, probably from the adjacent savanna of the Accra plains. It seems likely that the Mole birds move south in the late dry season, possibly even into the north of the forest zone. In at least one forest just south of the forest/savanna boundary we have data that suggest a slight influx of the species near the end of the dry season. There seems to be no previous evidence for movements of this species in West Africa, although it is migrant elsewhere (Benson 1964).

SENEGAL WOOD-HOOPOE Phoeniculus purpureus Seen nearly every day in small numbers during the wet season, but at the end of the dry season we saw only two during our entire stay. Greig-Smith described it as resident but evidently there must be a considerable movement south during the late dry season.

LESSER WOOD-HOOPOE Phoeniculus aterrimus We did not record this species at the end of the dry season although it was seen regularly in small numbers in the wet season. There might be a southward movement in the dry season, supporting the tentative conclusions reached by Elgood et al.

BLACK-THROATED HONEY-GUIDE Indicator indicator Greig-Smith did not give this as a migrant species. Small numbers were seen regularly in the wet season but none at the end of the dry season. It being conspicuous and not easily overlooked, we conclude that it must be migratory.

FLAPPET LARK Mirafra rufocinnamomea Greig-Smith described an apparent increase in numbers in the wet season but suggested that this might simply be a result of increased conspicuousness due to display flights. This species was recorded regularly during the wet season but not at the end of the dry season. One of us is familiar with this species in southern Ghana and has seen and flushed birds from grasslands outside the breeding season. We believe the apparent absence of birds in Mole late in the dry season to be real and that the species is at least partly migratory.

AFRICAN SAND MARTIN Riparia paludicola This species has not been recorded in the wet season and the four birds seen by us might represent a slight southward movement from more arid areas late in the dry season. Elgood et al. suggest that in Nigeria it is probably a migrant.

GREY-RUMPED SWALLOW Hirundo griseopyga The movements of this species in Africa are very poorly understood. We found it fairly common at the end of the dry season at Mole, when it has never been recorded in the wet season. We also have an observation of a strong north-west passage of this species with three other species of swallow at Asutsuare (06°03'N 00°16'W) in South-east Ghana on 29 January 1977. These observations suggest that the species moves into Ghana during the dry season, but whether it is a regular migrant or an irregular nomad we cannot say.

LONG-CRESTED HELMET-SHRIKE Prionops plumata Greig-Smith gave this as a partial migrant. We failed to record any of this very conspicuous and noisy species at the end of the dry season and we conclude that at this time the entire population moves south. In the parklands of the Accra area this species occurs most frequently during the late dry season, the birds probably having moved in from the adjacent savanna.

BRUBRU SHRIKE Nilaus afer Given by Greig-Smith as resident. Although it was seen in small numbers in the wet season we failed to find any at the end of the dry season, suggesting at least some degree of movement.

SNOWY-CROWNED ROBIN-CHAT Cossypha niveicapilla Fairly common in the riverine forests during the wet season, but none was seen at the end of the dry season. It is therefore probably migratory and not resident as suggested by Greig-Smith. Elgood et al. concluded there was a northward spread in the wet season in Nigeria. The very similar congener, C. albicapilla, was seen regularly in riverine forests at the end of the dry season and thus probably differs by being non-migratory.

GREY-BACKED EREMOMELA Eremomela icteropygialis The two birds seen by us might represent a slight southward movement into Mole from more arid areas during the late dry season.

PALE FLYCATCHER Bradornis pallidus Described by Greig-Smith as resident. We did not see any at the end of the dry season and it is therefore probably migratory with possibly only a short absence.

BLUE FAIRY FLYCATCHER Trochocercus longicauda Greig-Smith stated that this species was totally absent at the end of the dry season. Since the dry season normally ends sometime in April, and since he stated that no counts were made in either March or April, we find it difficult to understand how that conclusion was reached. We found it only slightly less abundant at the end of the dry season than in the wet season, and the difference can probably be accounted for by recruitment through breeding. Greig-Smith suggested that the species might move into deeper, less dry, forest in the late dry season but that cannot be so, as our observations were made in exactly the same stretches of forest as the observations he analysed. Elgood et al. found no evidence for movements in Nigeria.

PENDULINE TIT Remiz parvulus Fairly common during the wet season but not recorded at the end of the dry season.

SPOTTED CREEPER Salpornis spinolota This is a rare species and during the wet season was seen only occasionally. We would have expected to see at least a small number at the end of the dry season, considering the number of hours spent in the field, but we failed to do so. It is possible that the species moves south during the late dry season.

NIGERIAN LITTLE BUNTING Emberiza forbesi A common species in the wet season but apparently absent at the end of the dry season. Again Elgood et al. gave no evidence of movements in Nigeria.

SENEGAL FIREFINCH Lagonosticta senegala This was a common species in the wet season but was not seen at all at the end of the dry season. The species is known to be migratory in N.E. Nigeria (Jones and Ward, 1977).

ACKNOWLEDGEMENTS

We thank the Ghana Department of Game and Wildlife for permission to study birds at Mole. The work done in 1969 was partly financed by a grant from the Carnegie Trust.

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FOOD OF A BARN OWL Tyto alba IN NIGERIA

by Andrew Demeter

Received 29 September 1977
Revised 25 October 1977

INTRODUCTION

There is a good literature on pellet analysis of the widespread Barn Owl Tyto alba in Europe and North America. In Africa, the principal studies have been in the South, with a review by Vernon (1972) and a detailed investigation on material collected in South West Africa by Niethammer (1974-75). West Africa has been rather neglected and I know only of Barn Owl pellet analyses by Heim de Balsac (1965) and Heim de Balsac & Lamotte (1958). A drawback of the former of these two is that little or no quantitative evidence is presented, and there is a tendency to emphasize unusual records.

I thought it would be beneficial to analyse a small sample of 22 pellets which I collected on 21 December 1974, 1 km east of Samaru (11°10'N, 7°37'E), Nigeria. No attempt was made to search for roosting sites other than the one found, which was an erosion gully about 4 m deep. Although it was the breeding season, a single Barn Owl was repeatedly flushed from the wall of the gully, and I assume it roosted there solitarily. The surrounding vegetation is much-degraded Northern Guinea Savanna, presently uncultivated.

Pellets were prepared for examination using the technique of Vernon (1972). Specimens of the most abundant prey species, the rat Mastomys natalensis, were aged using a key based upon tooth wear (Delany 1971) to obtain information about the age structure of the population of this rodent. That might indicate a seasonal reproductive cycle (Sheppe 1973), as suggested for savanna rodents in Nigeria (Happold 1974).

RESULTS

Contents of the pellets are shown in Table 1. Rodents were identified, wherever possible, after Rosevear (1969), whose nomenclature is followed. It was not possible to identify birds from their skulls, due to lack of reference collection. Shrews (Soricidae) also presented difficulty. Crocidura sp. 1 is most probably C. flavescens manni, a large shrew with a wide distribution. The uncertainty lies in the fact that the authors who created this polytypic species (Heim de Balsac & Balroy 1966) themselves admit that distinction based solely on cranial characters from a still larger species, C. griffardi, is difficult. C. f. manni is a mainly Nigerian subspecies and the size of the specimen agrees well with the mean of a series of 32 manni given in the above paper.

The ten other small specimens, Crocidura sp. 2, are much more difficult to allocate and I am not sure whether they represent one or two species. Six have a coronoid height of 36-38 mm and four of 41-42 mm. A number of small forms have been described from West Africa, one, C. glebula Dollman, from Zungeru, Nigeria (Heim de Balsac 1968). At least the smaller specimens agree in size with the C. glebula group of small species.

Table 1 Prey species in 22 pellets of Tyto alba, Samaru, December 1974

SPECIES	No.	%
Birds		
? Estrildine finch	1	2
Warbler	1	2
Mammals		
Crocidura sp. 1	1	2
Crocidura sp. 2	10	19
Tatera kempi Wroughton	3	6
Mus haussa Thomas & Hinton	7	13
Arvicanthis niloticus Desmartes	6	11
Dasymys incomtus foxi Thomas	1	2
Mastomys natalensis A. Smith	21	37
Steatomys caurinus Thomas	3	6
TOTAL	54	100

Few skulls were intact in pellets, but it was possible to age M. natalensis in 20 out of 21 specimens, the upper molar row usually being intact with cuspidation and wear discernible. Individuals were allocated into age classes I to VI. Fig. 1 shows the age distribution of M. natalensis in the pellets. 70% are young and sub-adult animals (age classes I-III).

DISCUSSION

It is not possible to draw far-reaching conclusions from this small sample, and the great species diversity of Barn Owl prey, many with limited distribution, makes comparison even more difficult. The predominance of rodents is consistent with the results of most other pellet analyses of Tyto alba.

Shrews, which rated second in importance in the diet of the owl, were also second in abundance in South Africa on the whole, but constituted 41%

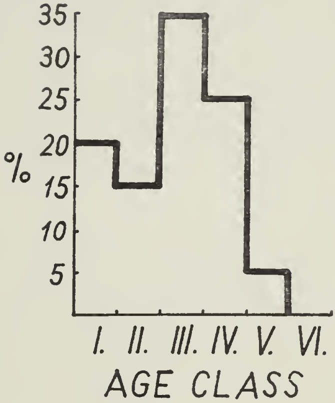

Figure 1 Age distribution of Mastomys natalensis in December 1974, from pellets of Tyto alba at Samaru (n=20)

of the prey at the suburban University of Natal (Vernon 1972) and more than half of the prey in the Serengeti National Park, Tanzania (Laurie 1971). Pygmy shrews of the religiosa-glebula species-group, to which Crocidura sp. 2 belongs, occurred in large numbers in pellets in the absence of rat and mice prey at Dori, Upper Volta (Heim de Balsac 1965). Birds may feature in the diet of the Barn Owl as prominently as 38% (Vernon 1972) and arthropods, reptiles, frogs and bats are preyed upon when rodents and insectivores are scarce (Niethammer 1974-75; Heim de Balsac 1965).

The dominant prey species Mastomys natalensis is a widespread and abundant rat; it will live away from habitation but today is chiefly associated with man's presence (in Nigeria, see Happold 1970, 1974 & 1975). That it constitutes much of T. alba pellet contents in settled areas is explained by Vernon (1972) by the attraction of these species to man's habitation. Crocidura flavescens manni is considered to be commensal by Happold (1975), who did not trap any in natural habitats; so the combined presence of these two species in the food of the owl suggests a semi-commensal nature even though it roosted some distance from houses and farmlands.

If Tyto alba kills M. natalensis without preference for any particular age class, the various age classes are represented in proportions comparable with those found in the wild, except the newborn young in the nest (Saint Girons 1973). Dean (1973) calculated a mean of 1.10 pellets/owl/day at roosting sites of T. alba, so 22 pellets collected on the 21st of the month contained prey representative for December.

Apart from Yankari Game Reserve (Happold 1970), where sub-adults and adults made up the population of M. natalensis at the end of the dry season, information about the age structure of rodent populations in Nigeria is lacking. Age distributions similar to Fig. 1 were obtained by Sheppe (1973) trapping in Zambia and Davies (1959) analysing Barn Owl pellets in South Africa at the equivalent time of the year, i.e. the second month of the dry season. Year-round study showed that those populations were seasonal breeding, displaying marked preference for the end of the rains and the early part of the dry season. From Fig. 1, that seems to stand true in savanna habitats of Nigeria as well.

It is worth noting the presence of Dasymys incomtus foxi in the pellets, for this is a species usually connected with wet ground (Rosevear 1969), which cannot be said of the area in which the pellets were collected. However, there is a growing list of exceptions to the above (e.g. Happold 1975) and this record stresses the point of Vernon (1972) who considered owls to be "efficient collectors" and a useful tool in the ecology and faunistics of small mammals.

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OBSERVATIONS ON THE STRIPED KINGFISHER HALCYON CHELICUTI

by P. W. Greig-Smith

Received 9 September 1977

The Striped Kingfisher Halcyon chelicuti occurs throughout the savannas of tropical Africa and is represented in West Africa by H. c. chelicuti. In several respects the species is atypical of the genus, being smaller, with a slighter bill and duller plumage, and occupying more arid habitats than any others (Table 1, also Bannerman 1930-51). It is most closely related to H. albiventris, which also shows a reduction in the amount of the brilliant blue plumage characteristic of most Halcyon species.

Very little has been published on the biology of H. chelicuti, the fullest accounts being those by Hoesch (1933), Priest (1934), and Bannerman (1930-51). This paper draws together some previous observations, and records new information gathered during a study of the Senegal Kingfisher H. senegalensis in Mole National Park, Ghana, in 1974 and 1975 (Greig-Smith 197Xa, 197Xb, and in prep). I visited Mole from 7 July to 28 August 1974, 3 July to 3 September 1975, and 28 October to 3 December 1975 (i.e. the wet season and early dry season). Observations were made almost daily, and information was gathered on all aspects of behaviour seen.

HABITATS AND DISPERSION

Throughout its range, H. chelicuti occupies wooded savanna or Acacia scrub, normally far from open water (Bannerman 1930-51, Chapin 1939, Vincent 1946). This results in segregation from other savanna Halcyon species, all of which are associated with water to some degree (Table 1). At Mole, I saw no encounters between Striped Kingfishers and the other Halcyons in the area (H. senegalensis, H. malimbica, and H. leucocephala), but Pygmy Kingfishers Ceyx picta were seen occasionally in the same habitats as H. chelicuti.

Territories of H. chelicuti were widely spaced, and apparently not contiguous. I only once saw a direct confrontation between adjacent pairs, although there were frequent vocal displays involving neighbours (see below). One territory was about 3.0 ha in size, and contained about one hundred mature trees, up to 12 m high, including many of the commonest savanna species (e.g. Burkea africana, Butyrospermum paradoxum, Combretum spp, Daniellia oliveri, Isoberlinia doka).

DIET AND FORAGING

Like all Halcyon species, Striped Kingfishers forage by a "sit-and-wait" strategy, choosing elevated perches from which to pursue prey on the ground. The diet apparently consists mainly of insects - notably grasshoppers - although beetles, caterpillars, mantids, butterflies, moths, cicadas, and termites have been recorded as prey by other observers (Priest 1934, Chapin 1939, Vincent 1946, Clancey 1964, Mackworth-Praed & Grant 1970, Thiollay 1970), while Hoesch (1933) mentioned lizards and "Doppelsleichen" as prey in S.W. Africa. At Mole, I saw birds capture grasshoppers (62% of identifiable prey), beetles (19%), (?hymenopteran) larvae (12%), and butterflies (6%).

The birds' usual feeding technique is in general similar to that used by Senegal Kingfishers (Greig-Smith 197Xb). They often showed sudden alert movements (e.g. of the head, and shifts of stance) before diving to the ground in pursuit of prey, after which they returned to the same or a nearby perch to handle the prey (however, Hoesch (1933) saw moths captured in flight). In about half the incidents, handling involved vigorous knocking of the insect on the branch to one side of the bird, probably in order to immobilise it (see Fry 1969, Greig-Smith 197Xa), interspersed with attempts at swallowing (see also Hoesch 1933). Beetles, larvae, and the smallest grasshoppers were not knocked, being swallowed after a few adjustments in the bill. There were no territorial displays during prey handling, in contrast to H. senegalensis (Greig-Smith 197Xa), perhaps because H. chelicuti used less exposed perches, and only rarely employed visual displays (see below). The perches used for foraging were mostly about 2.5 to 3.5 m high, in all the available savanna trees.

In a sample of 31 capture attempts, 25 (81%) were successful, a higher proportion than in H. senegalensis (59%, - see Greig-Smith 197Xa). This difference may be due to the fact that most of the dives by Striped Kingfishers were onto short grass or bare earth, whereas many of the Senegal Kingfishers' dives were into a flooded marsh, where prey's chances of escape would probably be higher. Measured rates of foraging varied from 3.3 to 16.7 dives per 100 mins foraging, comparable to the rates recorded for H. senegalensis (Greig-Smith 197Xa). I once saw regurgitation of a pellet containing fragments of insects, and pellet ejection is apparently regular in captives (McLeroth 1969).

BREEDING

Striped Kingfishers are non-migratory in West Africa (Elgood, Fry & Dowsett 1973) and elsewhere (e.g. Hoesch 1933, Priest 1934), and apparently breed during the wet season throughout their range (Hoesch 1933, Priest 1934, Traylor 1965, Mackworth-Praed & Grant 1970-73). Thus at Mole the birds were probably breeding during July and August, though the only breeding behaviour seen was allofeeding between 19 July and 14 August 1974. Allofeeding also occurs in H. senegalensis, but differs in two respects.

In H. senegalensis, the female adopted a crouching posture, and food was presented by the male in a single brief action (Greig-Smith 197Xb). In H. chelicuti, the bird receiving food (presumably the female) perched erect (Fig. 1), and the transfer of food involved prolonged efforts to break off pieces of the prey (beetles in all the incidents observed). In early August, one bird of a pair (the female?) begged from its mate, gaping with wings drooped and shivered.

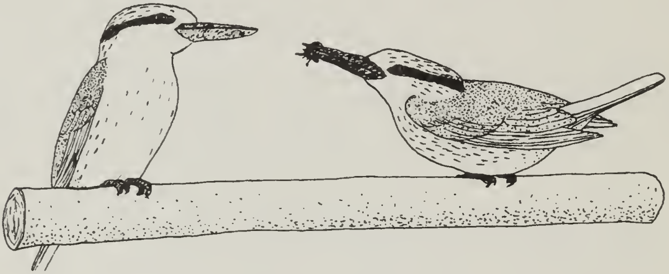

Figure 1 Postures of donating (on right) and receiving Striped Kingfishers during allofeeding

Nests are in holes in trees, usually those excavated by barbets or woodpeckers (Hoesch 1933, Bannerman 1930-51, Priest 1934, Chapin 1939, Roberts 1940, Vincent 1946) (birds roost in such holes outside the breeding season - Hoesch 1933). Nests have also been recorded in swallows' mud nests (Bannerman 1930-51, Chapin 1939), and Vincent (1934) suggested that the kingfishers may excavate holes themselves (see Meintjies 1943 and Greig-Smith 197Xb for evidence suggesting excavation by H. senegalensis). Descriptions of nests and the behaviour of adults at the nest are given by Hoesch (1933) and Vincent (1946). The clutch is 3 to 5 eggs (Hoesch 1933, Priest 1934, Chapin 1939, Mackworth-Praed & Grant 1970-73, Serle & Morel 1977).

VOCALISATIONS AND DISPLAYS

The calls of H. chelicuti have been described by most authors (e.g. Hoesch 1933, Bannerman 1930-51, Priest 1934, Chapin 1939, Clancey 1964, Mackworth-Praed & Grant 1970-73). and have recently received attention because of a theoretical interest in 'duetting' (e.g. Wickler 1976).

The characteristic "cheer-oh" call, given from a normal perching posture, consists of two parts: an introductory note followed after 0.3 sec by a brief trill, the whole call lasting about 1.2 sec (Fig. 2). This structure is similar to the call of H. senegalensis (Greig-Smith 197Xb), but much shorter. At Mole, most "cheer-oh" calls (62%) were given in apparent isolation from other behaviour, though 23% followed immediately after calls by neighbouring territory-holders (Table 2). Calls were often single, but were usually in bouts of up to about ten. Fig. 3 presents the numbers of calls heard at different times of day during the wet season (July and August), though excluding those associated with "duets" (see below). Most observation-time was spent between 0700-1100 and 1600-1830, and the totals for the second and third time periods in Fig. 3 are therefore exaggerated. Taking that into account, Fig. 3 shows that most calls were given in early morning (starting just before sunrise, at about 0515), then decreasing numbers in the middle of the day, none in late afternoon, and a brief burst in late evening. These last calls were all heard between 1835 and 1845 (just after sunset) and were particularly loud and distinct. On most occasions, all birds within earshot called in response to the first of these evening calls. The pattern of most frequent calling at dawn and dusk, with a 'chorus' at dusk, has also been recorded by Priest (1934), Chapin (1939), and Mackworth-Praed & Grant (1970-73). It seems likely that the function of the "cheer-oh" call is connected with advertisement of territory ownership.

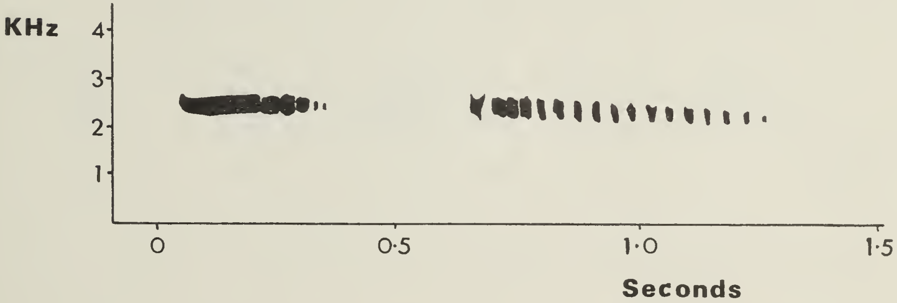

Figure 2 Sonagram of the "cheer-oh" call of Halcyon chelicuti (from a recording made in Kenya by M.E.W.North, on the disc 'More Voices of African Birds')

"Duets" between mates consisted of a combined visual and vocal display in which the birds perched facing one another, often on an exposed branch, and called repeatedly while rapidly spreading and closing the wings. The

Table 1 Weights, dimensions and habitats of adult *Halcyon* kingfishers mist-netted at Mole National Park

SPECIES	n	WEIGHT (g)	WING (mm)	EXPOSED CULMEN (mm)	BILL / WING	HABITATS
H. chelicuti	3	33.8	73.3	26.0	0.35	savanna
H. leucocephala	1	44.0	99.0	38.5	0.39	marsh/fringes of pools
H. senegalensis	2	54.7	104.0	47.5	0.46	marsh/woodland along streams
H. malimbica	12	91.8	119.5	50.9	0.42	dense riverine forest

Table 2 Contexts of "cheer-oh" calls of *Halcyon chelicuti*

	During aggressive incident	In response to call from mate	In response to call from neighbour	In isolation, mates together	In isolation, mates apart
Number of calls	6	3	43	19	115

Table 3 Contexts of head-bobbing by *Halcyon chelicuti*

	Before flight	After flight	While calling	After allo-feeding	Staring at prey or intruder	In isolation, mates together	In isolation, mates apart
Number of incidents	15	9	2	1	17	18	40

posture adopted was very erect, the head raised slightly, and the tail strongly cocked, exposing the brilliant blue rump and rectrices, which are otherwise visible only in flight. Neither calls nor wingspreads were closely synchronised, since birds sometimes started the display in unison, but ended it giving the actions alternately. The first calls, and often a few before the pair came together, were typical "cheer-oh" calls (Fig. 2), but were then altered to a prolonged series of trilled notes (Fig. 4), separated by intervals of 0.5 sec or less, and becoming more rapid as the display progressed. Wingspreads similarly became more rapid, initially being held for 1-2 sec, but later for less than 0.5 sec.

This display has been mentioned by Hoesch (1933), Chapin (1939), Clancey (1964), Mackworth-Praed & Grant (1970-73), and Wickler (1976), and is similar in most respects to the duet of H. senegalensis (Greig-Smith 197Xb).

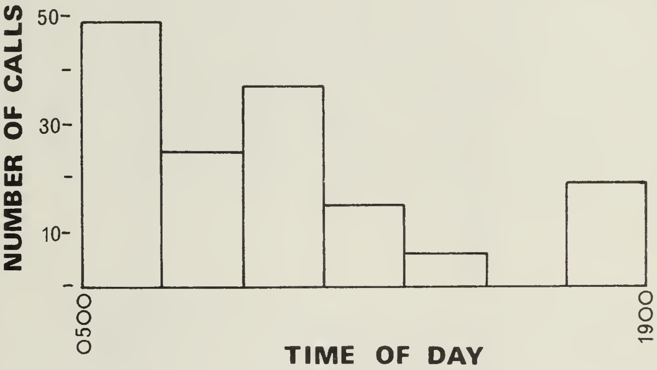

Figure 3 Diurnal pattern of "cheer-oh" calls of Halcyon chelicuti

Wickler (1976) cited evidence which suggests that the duet is a communal territorial display, and may not convey any information between mates, which is the principal alternative advantage proposed for duetting (see Thorpe 1972). At Mole, duets were visible and audible over large distances, and mates were always perched within about 1 m of one another, while Hoesch (1933) found that duets occur before, during, and after the breeding season, so that Wickler's interpretation may be correct. However, it appears that the function of territorial advertisement is fulfilled by the "cheer-oh" calls, and I never saw nor heard other birds in the vicinity of a duetting pair (but see Wickler 1976). Therefore it seems possible that the duet may include some communication between mates, perhaps related to synchronisation of breeding activity (see Thorpe 1972).

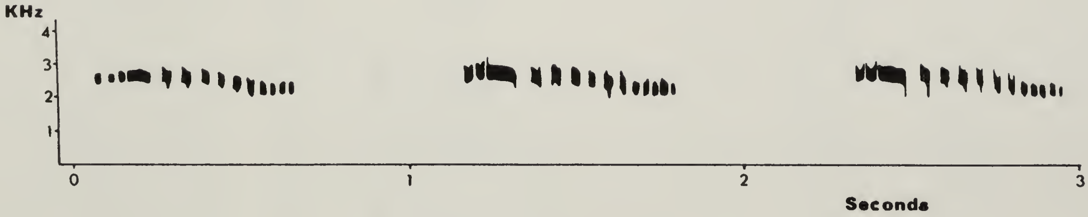

Figure 4 Sonagram of the calls given during 'duets' by Striped Kingfishers (from a recording made in Kenya by M. E. W. North, on the disc 'More Voices of African Birds').

In addition to these calls, I heard weak trills given in apparent isolation, and once a harsh rasping alarm call. Vincent (1946) mentioned a low squeak as an alarm call. Lowe (1937) stated that the species has a song resembling that of the shrike Tchagra senegala, but no other observer has heard this, and it may be an error.

AGGRESSION

The only occasion on which I saw aggression between Striped Kingfishers was in July 1975, when a bird chased one of a pair, after which the other gave eight wingspreads in quick succession, together with trilled calls, whereupon the birds dispersed.

Interspecific aggression has been noted for H. chelicuti (Mackworth-Praed & Grant 1970-73, Hoesch 1933), though McLeroth (1969) found that two captive young birds were very tolerant of intruding robin-chats Erythropygia leucophrys and bulbuls Pycnonotus barbatus. The birds at Mole attacked several species which entered their territories, including doves Streptopelia senegalensis, canaries Serinus mozambicus, wydahs Vidua macroura, and warblers Eremomela pusilla. They became alert on the arrival of bulbuls and shrikes Corvinella corvina. However, they were remarkably tolerant of the approach of humans, allowing approach to distances of less than 3 m (see also Bannerman 1930-51, Priest 1934, Vincent 1946). Hoesch (1933) was attacked in the vicinity of the kingfishers' nest.

OTHER BEHAVIOUR

Most comfort behaviour was very similar to that described for H. senegalensis by Greig-Smith (197Xb), though in addition to regular bill-wiping on the branch to one side of the bird, there was occasionally a curious vigorous stab at the branch between the feet, the function of which is obscure. One bird was seen bathing, by repeated plunges into a shallow puddle, followed by vigorous preening. Sunbathing, relatively common in H. senegalensis, did not occur; indeed, perches exposed to the sun were very rarely used.

Rapid vertical head-bobbing was common, occurring in bouts of 2-5, in a variety of contexts (Table 3). Bobs before taking flight were often more pronounced than at other times. This behaviour occurs very rarely in H. senegalensis (Greig-Smith 197Xb), and has been seen in H. malimbica (Walker 1939, and pers. obs.), but it is most common in the small river kingfishers Ceyx picta and Alcedo cristata (pers. obs.). It might function as an aid to judgement of distance, perhaps necessitated by the small size of the species which use it (see also Hoesch 1933). However, some Polynesian Halcyon kingfishers apparently use head-bobbing as a social display (D. T. Holyoak, pers. comm.) which might also be the case here. McLeroth (1969) records head-bobs in alarm and during calling by captive H. chelicuti.

When looking at prey or at an intruder, birds often cocked their heads sideways, an action I have seen in no other Halcyon species. Prior to flight, the whole body was sometimes dipped momentarily - perhaps a flight-intention signal. Rapid outward flicks of the wing-tips may also have been intention signals, although they occurred in several different contexts.

DISCUSSION

In its exclusive territoriality and aggression to other species, H. chelicuti resembles H. senegalensis, in which these features were considered to be adaptations to a sit-and-wait foraging strategy (Greig-Smith 197Xb). In other ways the behaviour of H. chelicuti is very different, probably as a result of its preference for arid habitats.

The small size of the birds (which may be appropriate to their dietary opportunities in savanna), and the abundance of birds of prey in the savanna at Mole (Greig-Smith 1976) are likely to make them particularly susceptible to predation. Their cryptic plumage, habitual passivity, avoidance of exposed perches, brief calls, and lack of obvious visual displays (such as the aerial flights and wingspreads of H. senegalensis; see Greig-Smith 197Xb) may all contribute to reducing the risks of predation. Hoesch (1933) and McLeroth (1969) have described the response of Striped Kingfishers to the appearance of birds of prey, involving the adoption of an immobile, elongated posture that tends to camouflage the bird against the branch on which it is perched (though Hoesch interpreted the associated exposure of the blue rump as a display intended to startle the predator).

ACKNOWLEDGEMENTS

I am grateful to the Ghana Game & Wildlife Department for permission to study birds at Mole, and for the facilities made available. The study was financed by grants to the 1st and 2nd Aberdeen University Ghana Expeditions. The Laboratory of Ornithology, Cornell University, kindly granted permission for me to make the sonagrams in Figs. 2 and 4. Doug Sobey helped me to identify the trees.

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RINGING IN NIGERIA 1977. 20th ANNUAL REPORT

by R. E. Sharland

Received 28 December 1977

In the spring of 1977 the Kano wagtail roost (see previous Reports in this journal) was suitable for netting and just over one thousand wagtails and a few acrocephaline warblers were ringed. In the autumn netting continued in the scrub inside Kano Zoo (see 19th Report, Bull. Nigerian Orn. Soc. 13, 1977: 64-65). This was not nearly as productive as in the previous year, probably as a result of increasing urbanization and industrialisation nearby. A small batch of scrub near Kano State Pig Farm was investigated and was found to be quite as good as the Zoo area.

Schedule 1 Numbers of Palaearctic species ringed

		1977	Total to date
Marsh Sandpiper	Tringa stagnatilis	1	18
Wood Sandpiper	T. glareola	24	535
Green Sandpiper	T. ochropus	1	33
Common Snipe	Gallinago gallinago	7	61
Jack Snipe	G. minima	1	21
Little Stint	Calidris minuta	9	340
Ruff	Philomachus pugnax	2	607
Hoopoe	Upupa epops	5	19
Wryneck	Jynx torquilla	5	67
Swallow	Hirundo rustica	1	1465
Yellow Wagtail	Motacilla flava	1057	38065
Tree Pipit	Anthus trivialis	9	131
Red-throated Pipit	A. cervinus	1	133
Wheatear	Oenanthe oenanthe	1	27
Redstart	Phoenicurus phoenicurus	9	276
Nightingale	Luscinia megarhynchos	32	393
Bluethroat	L. svecica	1	5
Sedge Warbler	Acrocephalus schoenobaenus	28	2024
Reed Warbler	A. scirpaceus	9	385
Icterine Warbler	Hippolais icterina	7	173
Melodious Warbler	H. polyglotta	13	104
Olivaceous Warbler	H. pallida	17	166
Garden Warbler	Sylvia borin	180	2118
Whitethroat	S. communis	18	2881
Lesser Whitethroat	S. curruca	3	160
Subalpine Warbler	S. cantillans	6	204

Willow Warbler	Phylloscopus trochilus	41	943
Wood Warbler	P. sibilatrix	6	165
Bonelli's Warbler	P. bonelli	1	21
Spotted Flycatcher	Muscicapa striata	2	284
Pied Flycatcher	Ficedula hypoleuca	10	256
	Total	1507	54650
	Ethiopian birds	222	14845
	Grand Total	1729	69495

Ethiopian birds ringed in 1977 included several forest species trapped at Kagoro, Plateau State. This is a most interesting area, which it has been proposed should be afforded Reserve status. The Red-capped Robin-chat *Cossypha natalensis* has been caught and ringed there and is the first record of this East and Central African species in Nigeria or Upper Guinea. Examples of the brown-throated population *moloneyanum* of the Brown Illadopsis *Trichastoma fulvescens* have also been netted. Details will appear in a forthcoming number of this journal.

A Mottle-throated Spinetail *Telecanthura ussheri* trapped at Birnin Gwarri, Kaduna State, and released at Zaria, was controlled in the same place At Birnin Gwari - a well - one year later.

Schedule 2 Controls in Nigeria

Osprey *Pandion haliaetus*

M.8086 Ringed 14/7/74, Hyvinkaa, Finland 60°39'N 24°58'E
Controlled Bornu State 11°40'N 10°11'E 1/11/74

Yellow Wagtail *Motacilla flava*

K531485 Ringed 21/8/68, Espoo, Uusimaa, Finland 60°09'N 24°44'E
Controlled Vom 9°44'N 8°48'E 13/10/74

L468160 Ringed 7/4/74, Castellano San Elpidio, Italy 43°15'N 13°45'E
Controlled Vom 28/11/74

L458784 Ringed 27/4/74, Castellano San Elpidio, Italy 43°15'N 13°45'E
Controlled 21/11/74 Vom

L156318 Ringed 23/4/73, Viserbella, Italy 44°05'N 12°32'E
Controlled 6/12/73 Vom

Schedule 3 Birds controlled outside Nigeria

Yellow Wagtail *Motacilla flava*

Jos.3803 Ringed 9/3/61, Kano 12°00'N 8°17'E
Controlled 28/4/61, Gzira, Malta 35°50'N 14°32'E

JS64877 Ringed 26/1/74 Vom
Controlled 12/10/74, Kirkop, Malta 35°51'N 14°29'E

Jp04430 Ringed 29/3/73 Vom
Controlled 23/4/73, Marsascala, Malta 35°52'N 14°34'E

Details are still awaited of two Garganey Anas querquedula, a White Stork Ciconia ciconia, and a Yellow Wagtail recovered in Nigeria, and of two Yellow Wagtails ringed in Kano and recovered in Europe.

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NIGHT HERON AND LESSER BLACK-BACKED GULL RECOVERIES IN CHAD

by C. C. H. Elliott

Received 17 October 1977

The following recoveries of foreign-ringed birds have been made in Chad in recent months:

Night heron Nycticorax nycticorax
MOSKWA D755 983
juv. 30.5.75 nr. Goloya Pristan, Kherson, Ukraine S.S.R. 46°31'N 34°36'E
ca. -.12.76 Ere, Bongor, Chad 09°45'N 15°49'E
- caught in fish trap, presumed dead.

This is the thirteenth recovery of a palaearctic Night Heron in Africa and fills in another gap in the recovery pattern, stretching the breadth of Africa immediately south of the Sahara. The other countries involved are Senegal (from Spain), Gambia (France), Guinee (Hungary, Czechoslovakia), Sierra Leone (France, two), Mali (France), Ahaggar, Algeria (Hungary), Nigeria (Hungary, USSR), Cameroun (USSR), and Sudan (USSR). It suggests that the western European populations of Night Herons tend to winter in western Africa while the eastern population choose central and eastern Africa, all at roughly the same latitude.

Lesser black-backed gull Larus fuscus
HELSINKI HT - 031.805
pull. 18.7.75 Virolahti (Kymi) Finland 60°25'N 27°24'E
ca. -.12.75 Ere, Bongor, Chad 09°45'N 15°49'E
- caught in a fish trap, died.

STOCKHOLM 8.041.535
pull. 1.7.76 Angholmarna, Trolle-Ljungby, Skane, Sweden 55°58'N 14°26'E
ca. 13.2.77 Bidanasso, 10 km E of Guelendeng, Chad 10°51'N 15°53'E
- dead on a sand bank in the Chari River.

In the western part of Lake Chad the Lesser Black-backed Gull is occasional (Ash, Ferguson-Lees & Fry 1967) or regular (Vielliard 1972, who says it is rare on the eastern Chadian side). I have not recorded the species in the vicinity of N'Djamena, where L. cirrocephalus is the common gull. On the West African coast Bannerman (1953) noted that the Scandinavian race is much less common than the British one.

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SEASONAL CHANGES IN NUMBERS OF WADERS AT CAPE COAST, GHANA

by M. A. Macdonald

Received 20 September 1977

Many of the salt-water lagoons on the coast of Ghana have been converted to pans for evaporation of salt. This habitat is very attractive to waders and the larger salt-works at Weija (near Accra) and Elmina (near Cape Coast) hold wintering populations of several hundred or more birds of many species. Migrants from Europe and the Arctic are especially well represented.

This paper describes the seasonal variations in numbers of waders on a small area of salt-pans and associated marsh and mangrove swamp at Iture, 05°05'N, 01°22'W, about 10 km west of Cape Coast, Ghana. The pans at Iture, although much smaller and holding fewer birds than those at Elmina a few km farther west, had several advantages as a study area: the birds could be counted quickly and accurately; there was almost no disturbance; there was little movement of waders into or out of the area during a count (large-scale movements at Elmina made accurate counts very difficult); and the greater diversity of habitat at Iture probably attracted a slightly greater variety of waders.

Methods

Ninety-six counts were made, about twice weekly in the winter and weekly in the summer, between 24 March 1976 and 3 July 1977, covering one arrival and two departures of the northern migrants. All counts were made between 1600 and 1730 h GMT. By driving slowly through the middle of the area of pans the birds could easily be counted individually. The commonest species were counted twice and the higher count entered in the records. A brief walk of about 300 m through the marsh and mangrove areas completed the count.

Results

Twenty-one species of wader (Charadriidae) and a pratincole (Glareolidae) were recorded. Seasonal changes in numbers are described below and a brief qualitative description of the habitat preferences from my experience in southern Ghana is provided. The results for the main species are summarised in Table 1.

Table 1 Summary of seasonality of waders at Iture and at Weija, Ghana

		First date	Main Season	Last date	Summer	No. weeks late at Cape Coast
P. squatarola	Iture	(24 Oct)	late Oct-late May	(7 Jly, 5 Jun)	+	12
	Weija	late Jly-4 Aug	late Jly-May	-	+	
C. hiaticula	I	(10 Oct)	mid Oct-May	(1, 31 May)	+	9-10
	W	29 Jly-2 Aug	Jly/Aug-May	-	+	
C. dubius	I	17 Oct	mid Nov-late Dec	< 24, 30 Mar		-
N. phaeopus	I	(23 Aug)	except Jly	-	+	1-3
	W	3-14 Aug	-	-	+	
T. nebularia	I	(23 Aug)	except Jly-Aug	(7 Jly, 26 Jun)	+	2-3
	W	1-10 Aug	-		+	
T. glareola	I	(23 Aug)	late Aug-early May	1, 5 May	+	3-5
	W	19 Jly-2 Aug	mid Jly/Aug-late Apr	6 May	+	
T. hypoleucos	I	-	except Jun	-	+	-
	W	29 Jly-4 Aug	-	-	+	
T. totanus	I	23 Aug	mid Sep-Apr/May	5 May, 20 Apr		3-6
	W	29 Jly-4 Aug	early Aug-May			
T. erythropus	I	10 Oct		1 May, 30 Mar		5-6
	W	22 Aug-3 Sep		"May"		
C. minuta	I	23 Aug	early Oct-late Apr	5, 8 May		2-6
	W	2 Aug-5 Aug	late Aug-Apr	"May"		

Values in the right-hand column are based both on first dates and on the beginning of the main seasons at Cape Coast and Weija. Obvious summering records are excluded and extreme dates at Iture for those species which summered are in parenthesis. Some species for which insufficient data exist are omitted.

The date 23 August 1976 occurs frequently in the results. On that date, which followed a period of some 15 hours in which over 60 mm rain fell, there was a very obvious influx of waders of several species. They may well have been migrating when the heavy overcast and rain forced them down.

Where relevant, observations from other less frequently visited parts of Ghana are detailed.

Systematic List

GREY PLOVER Pluvialis squatarola (Fig. 1) Present throughout the year but infrequent and in small numbers between June and October. The main season was between late October and late May, when numbers varied between six and ten. No indications of passage. Coastal, including open shores.

RINGED PLOVER Charadrius hiaticula (Fig. 1) Apart from three summer records (up to five birds between 24 June and 7 July 1976) and one on 27 August 1976 all fell in the periods up to 5 May 1976, and between 17 October 1976 and 31 May 1977. More numerous 15 February to 27 March (13–19 birds on 10 counts) than in the remainder of the season (0–8 birds on 41 counts). Lagoons and salt-pans.

LITTLE RINGED PLOVER C. dubius (Fig. 1) The only record in 1975–76 was of three birds on 18 January, before the scheduled counts began. No birds were recorded thereafter until 17 October 1976. From 12 November to 30 December numbers were high (over 12 on 9 out of 14 counts) then low (below 12) until 5 February when peaked at 32 birds. Second peak of 17 on 23 February, tailing off until 30 March. Highest numbers preceded peak of C. hiaticula, possibly reflecting some ecological interaction. Species very local; my only other records were from Ankaful (N.W. of Cape Coast) on 18 December 1976, Nakwa on 23 December 1976 and Tafo-Akim (E.R.) on 13 February 1977. Scarce around Accra on inland waters (Grimes 1972, Taylor in prep.).

WHIMBREL Numenius phaeopus (Fig. 1) Present throughout the year, but least frequent and least numerous in July. Evidence of passage with 12 birds on 23 and 27 August 1976 (compared with one in June and 1-2 until 18 September). Other counts variable, up to nine birds. Mainly coastal (including rocky shores) but a few inland records.

CURLEW N. arquata Recorded on 3 out of 6 counts in October 1976 (1-2 birds), 28 November (1) and 5 December (1). Then singles on 13 March, 1 May and 18 May 1977. My only other record is of ca. 3 at Weija (Accra) on 8 July 1977. Iture counts suggest a small autumn passage and an even smaller return movement. Grimes (1972) cites no records from Accra between late May and early August. Coastal.

BLACK-TAILED GODWIT Limosa limosa Three records, one Iture 23 August and 6 September, and three Cape Coast 3 September 1976 suggest an autumn passage only. The last two records were of birds with L. lapponica and N. phaeopus

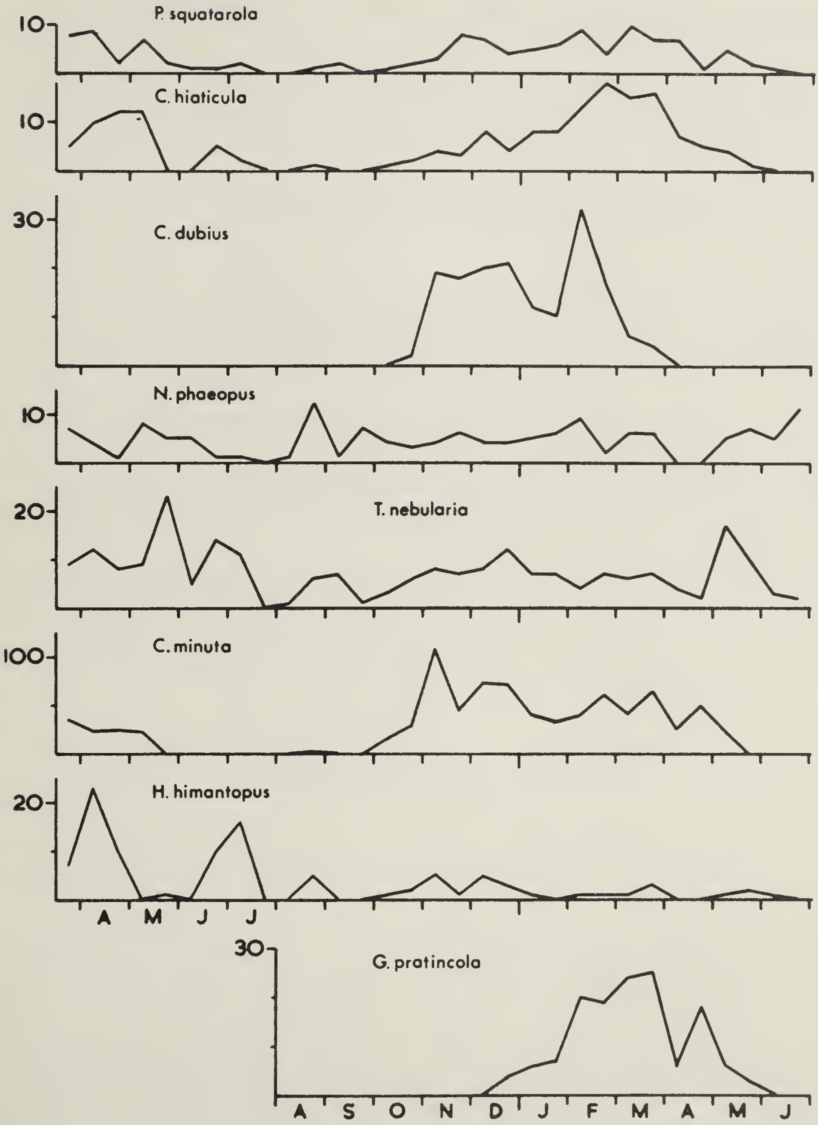

Figure 1 Abundance of seven species of wader and a pratincole at Iture, Ghana, March 1976–June 1977.

For convenience and to remove some of the minor variation between individual counts, points plotted are the maxima for 'half-month' (covering 2-5 counts).

respectively. Grimes (1972) gives Accra records late July to early October, and again in March. Coastal.

BAR-TAILED GODWIT L. lapponica Recorded at Iture only on 31 March 1976 (1), 6 September 1976 (1) and 24 October 1976 (2). Regular at Elmina in very small numbers and local at other coastal lagoons. Earliest record ca. 10 birds at Shama 24 August 1976, but it is possible that these were summering birds. Coastal.

SHORT-BILLED DOWITCHER Limnodromus griseus One on 24 October 1976 (Macdonald 1977).

GREENSHANK Tringa nebularia (Fig. 1) Present throughout the year, but scarce mid-July to mid-August. Probable passage on 25 May 1976 with 23 birds (level before and after 0-3 birds), possibly also late June to early July 1976, 1 May 1977, 31 May 1977. Mainly coastal, but also inland in moderate numbers.

MARSH SANDPIPER T. stagnatilis Up to two birds present 24 March to 13 May 1976. One 23 August with other moving species. Regular 17 October to 27 December 1976 and 20 February to 27 March 1977 but absent January and early February. Species appears to have very special requirements and Iture was much less favoured than Elmina so no conclusions can be drawn from Iture dates. Mainly coastal, occasional inland.

WOOD SANDPIPER T. glareola A flocking species which was very variable in numbers, the variations probably reflecting the frequent visible local movements rather than passage. Absent from 1 May 1976 except for singles on 7 July and 14 July. 45 appeared with other species on 23 August (probable passage), and it then was recorded regularly until 5 May 1977. Mainly inland on waters and wetlands of all types.

GREEN SANDPIPER T. ochropus One bird on 20 February 1977 was the only record from Iture. At Cape Coast singles were recorded in November and March. Frequent in small numbers inland at Tafo-Akim 12-13 February 1977.

COMMON SANDPIPER T. hypoleucos Recorded in every month, but scarcest in June. Numbers were usually below four, but 14 on 23 August 1976 and 11 on 7 March 1977 probably indicated passage. Mainly inland in wet habitats of all types.

REDSHANK T. totanus Recorded regularly but in small numbers up to 5 May 1976 and from 18 September 1976 to 20 April 1977. Two on 23 August 1976 were the only intervening records and the only evidence of passage. Coastal.

SPOTTED REDSHANK T. erythropus Common on coastal lagoons, but like T. glareola tended to move locally in large flocks and records from Iture were irregular and variable in numbers. Recorded up to 1 May 1976 and between 10 October 1976 and 30 March 1977. References in Bannerman (1953) to large flocks of T. totanus in eastern Ghana were assumed by Grimes (1972) to be in error for T. erythropus. This is a tempting assumption in view of the present status of the two species in Ghana but major changes in status cannot be excluded (see note below on Charadrius forbesi and C. marginatus). Mainly coastal.

TURNSTONE Arenaria interpres Recorded on 24 March (nine birds) and 1 May 1976 (four) then up to ten birds on 6 out of 8 counts between 24 June and 25 July 1976. Probable passage with other species on 23-27 August 1976, and regular between 5 December 1976 and 31 May 1977. Highest numbers up to 20 February (up to 24 birds), later no more than five. This seasonal pattern, as well as being different in the two springs, was quite different from that of any other species and unexpected for a northern migrant. Coastal, including rocky shores.

CURLEW SANDPIPER Calidris ferruginea Recorded at Iture on 7 occasions only: 13 April 1976 (1), 23 April (4), 29 June (9), 2 July (18), 23 August (9), 6 September (1) and 24 October 1976 (1). One bird was seen at Elmina on 5 March 1977. This irregular occurrence was in marked contrast to the large and frequent flocks found in the Accra area (Grimes 1972, Taylor in prep.). The June-August records probably represent passage birds. Coastal.

LITTLE STINT C. minuta (Fig. 1) The commonest wintering wader in the Cape Coast area. Recorded up to 5 May 1976. One bird arrived with the passage on 23 August 1976, but main attendance began on 3 October. Large influx and probable passage 1-4 November (108 birds), 12 November, and 28 November 1976, settling to around 40-50 birds for the rest of the winter. Numbers began to decrease 27 April 1977, last date 8 May. Mainly coastal.

SANDERLING C. alba One record of a single bird at Iture on 13 April 1976. In the Cape Coast area this was almost totally restricted to the sandy seashore where it frequented the latrine areas of the coastal villages. Records fell between 22 August and 5 March, but season possibly longer.

RUFF Philomachus pugnax Three records only, on 1 November 1976 (3 birds), 7 November (1) and 1 December 1976 (1). My only other record is of one at Nakwa on 23 December 1976. Like C. ferruginea this is much commoner in the Accra area (Grimes 1972).

BLACK-WINGED STILT Himantopus himantopus (Fig. 1) Breeding has not been proved in the Cape Coast area, but birds do breed in the wet season at Weija. Records at Iture were: between 24 March and 23 April 1976 (peak of 23 on 13 April); one on 25 May; five, ten and 16 on 24 June, 29 June and 2 July 1976; five on 23 August with other species; up to five birds regularly between 10 October 1976 and 7 January 1977; up to three between 5 February and 13 April 1977; and up to two birds from 11 May to 5 June 1977. The flock of 23 in April 1976 may represent return passage of Palaearctic birds and the August record the autumn passage, but the build-up in June and July seems most likely to have involved the local population. Moreau (1972) considered that most of the stilts in the northern tropics in winter were northern migrants. Recorded more frequently 1975-76 than 1976-77. Mainly coastal.

PRATINCOLE Glareola pratincola (Fig. 1) Full counts were not made in 1975-76 but the high numbers of birds in February-March disappeared in the second half of March and the species was absent during the wet season. No local breeding was suspected. One bird was recorded on 19 December 1976 and from 30 December species was regularly recorded. Highest numbers were in early February to late April (but were well below the levels of the previous year - less than 30 compared with over 50). Fluctuations indicating possible passage during March. After 18 May 1977 only one pair of breeding birds was present, from 13 June with a single flying chick. A few pairs bred nearby at Elmina. The more numerous breeders at Weija arrive from February onwards (Grimes 1972). Coastal.

Two other species of northern wader were noted at other localities in Ghana. An Avocet Recurvirostra avosetta was at Elmina on 11 January 1976, and Snipe Capella gallinago were recorded on four occasions between December and February at Akuse, Accra, Tafo-Akim and Nakwa.

Two species which were not recorded during the period were Forbes' Banded Plover Charadrius forbesi and the White-fronted Sand Plover C. marginatus. In 1872 Shelley collected both on salt pans at Cape Coast and described C. marginatus as common. J. M. Winterbottom also found it common in 1930 (Bannerman 1931). This suggests a major change in status of C. marginatus in the last 30 years, and possibly of C. forbesi over a longer time. C. marginatus still breeds on the Accra Plains while C. forbesi appears to have become less frequent there in the last 20 years (Grimes 1972).

Discussion

The broad picture of wader seasons obtained at Iture compares well with that given by Grimes (1972, 1974) for the Accra Plains (especially the salt-pans at Weija). The same species were recorded during the summer months with the exception of Limosa lapponica, Tringa totanus and Calidris ferruginea two of which were so uncommon in the Cape Coast area that absence of summer records at Iture was not surprising.

More interesting was the difference in arrival dates of individual species in the two areas, the arrival in Accra tending to be considerable earlier than at Cape Coast. Grimes (1974) gave arrival dates at Weija for 1966, 1968 and 1970 which indicated that, with the exception of T. erythropus which arrived in late August-early September, waders came in fairly regularly in late July to early August. Arrival dates were between 3 weeks (N. phaeopus, T. nebularia and C. minuta) and 9-12 weeks (P. squatarola and C. hiaticula), later at Iture than at Accra. The departure dates for the same species were much more comparable (Table 1). In Senegal arrival dates were slightly later than at Weija but in all cases were earlier than at Cape Coast (Morel & Roux 1966 cited by Grimes 1974).

Grimes (1974) suggested that waders entered West Africa by two routes: direct across the Sahara and along the coast from Morocco southwards. This was supported by radar observations of departing waders at Accra, and explained the difference between the dates of arrival in Senegal and Accra. If the Cape Coast birds arrive by one of these routes (as it seems they must) some attempt must be made to explain the consistently later arrival of the waders there.

Two fairly obvious alternative hypotheses may be advanced here. Either the Cape Coast birds move in from another coastal site occupied earlier, in which case the distance (150 km from Accra in the east and 2400 km from Senegal in the West) and time-lags involved make it seem more probable that any movement is along the coast from Senegal, or some ecological factor is involved. The Accra Plains and the Cape Coast plains, although so close to each other, are very different in climate and ecology, the former being dry savanna and the latter moist coastal plain. These differences are reflected mainly in the land-bird fauna, but it is not impossible that conditions in the Cape Coast area do not become suitable for migrant waders until several weeks after they occupy the dry eastern plains, when they may move in from dryer inland or coastal areas.

Acknowledgements

I am grateful to Mr J. Rentzos for permission to visit the pans at Iture. Dr I. R. Taylor shared in some of the observations detailed. Drs R. W. Summers and C. H. Fry read and made helpful comments on an earlier draft. Prof G. M. Dunnet kindly made available facilities at the University of Aberdeen where the paper was prepared.

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THE BIRDS OF BIA NATIONAL PARK, GHANA

by I. R. Taylor and M. A. Macdonald

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In May 1974, 306 km^2 of primary moist evergreen forest in Western Ghana was established as a National Park, thus protecting one of the few large areas of unexploited high forest in the country. The Park lies at the south-west corner of the Southern Ashanti Uplands, an extensive low plateau at 150-300 m a.s.l., with a rainfall of 165-180 cm p.a.

The major conservational interest in Bia National Park concerned the mammals (including Chimpanzee Pan troglodytes, Forest Elephant Loxodonta africana cyclotis, and Bongo Boocercus eurycerus), but with the remaining primary forest in West Africa being exploited at an alarming rate the Park will probably become an important refuge for specialised forest birds. The continued existence of the Park is, however, by no means secure. Already (in April 1977) the southern part of the forest has been opened for timber operations, and the area of the Park has been reduced to 78 km^2. Even this remnant may not be safe for very long.

As part of a wider study of forest bird ecology, we visited Bia between 4 and 11 April 1977. All our observations were made at the northern end of the Park (6^0 38' N, 3^0 08' W), principally in primary forest but also in secondary and edge habitat resulting from human interference.

In view of the scarcity of information on species composition in West African primary forest, a briefly annotated list of the species we observed seems valuable. Ecological data collected during our visit will be published elsewhere.

Systematic list

Neophron monachus Two and four soaring over a clearing.
Gypohierax angolensis One and two soaring over a clearing.
Polyboroides radiatus One over primary forest and regularly seen over clearing.
Urotriorchis macrourus One flying from secondary to primary forest on morning of 9th, and in secondary and edge trees on evening of 10th.
Accipiter toussenelii One over clearing in display flight.
Buteo auguralis Two soaring and in secondary growth.
Stephanoaetus coronatus One over primary forest.
Hieraaetus dubius One soaring with P. apivorus on 5th; one over primary forest on 6th.

Milvus migrans One and two birds soaring over clearing.

Pernis apivorus Two soaring over secondary growth.

(*Aviceda cuculoides* One probable in secondary growth, on 8th.)

Francolinus lathami Two in primary forest.

Guttera edouardi Feathers found in primary forest.

Sarothrura pulchra Twice heard in secondary growth.

Columba unicincta One singing in primary forest on 6th; one singing and performing flight display in clearing on 8th; two flying over clearing towards primary forest on morning of 9th.

Turtur brehmeri Singles flushed in primary forest three times, and one flying through secondary growth towards primary forest.

Treron australis Common in secondary growths where it was especially obvious in morning and evening. Only one group in primary forest.

Psittacus erithacus Regular in twos and threes in secondary growth. Two in primary forest.

Poicephalus gulielmi Very obvious in secondary growth in morning and evening in flocks of up to 30. Definite evening flights from clearings towards primary forest.

Agapornis swinderniana Ten over clearing on evening of 7th; six in primary forest on 8th; five and seven in secondary growth on 9th (Macdonald & Taylor 1977).

Turacus macrorhynchus Apparently uncommon, calls heard from secondary growth on most mornings and once in primary forest.

Corythaeola cristata Apparently not common, calls of one or two groups heard in primary forest each day. Two seen at Camp 1 on 6th.

Cuculus canorus One over clearing. Race not known, but habitat and occurrence of other Palaearctic migrants that day makes *C. c. canorus* not unlikely.

C. solitarius Song heard from secondary growth every day; three times in primary forest.

C. clamosus Heard once in primary forest and twice in secondary growth.

Chrysococcyx cupreus Song heard twice in primary forest and once in secondary growth. All single birds.

C. klaas Regular song heard each day in primary and secondary habitats.

C. caprius One singing in clearing on 10th.

Ceuthmochares aereus Common in primary and secondary growth.

Centropus leucogaster Calls heard in secondary growth most mornings; one heard in primary forest on 8th.

Apus apus Small numbers over clearing and primary forest 5th - 7th and 10th; very numerous 8th - 9th.

Cypsiurus parvus One on edge of forest.

Chaetura sabini The commonest of the spinetails. Moderate numbers in clearing each day, and over primary forest on 5th and 7th.

C. melanopygia Up to four over clearing, on 5th and 7th - 10th; three over primary edge on 10th (Macdonald & Taylor 1977).

C. cassini Up to three over clearing, 4th - 10th.

Halcyon senegalensis A pair resident and singing in clearing.

H. malimbica One seen in primary forest.

H. badia A few songs heard daily in primary forest and twice from camp clearing.

Merops albicollis Common in wandering flocks in primary and secondary habitats.

Eurystomus gularis Once seen in primary forest and up to five at a time in secondary forest and clearings.

Phoeniculus bollei Up to two in secondary growth on three occasions.

Tockus camurus One group heard in primary forest.

T. fasciatus Fairly common in secondary growth; found in primary forest three times.

Tropicranus albocristatus Two in secondary growth and one in primary forest.

Ceratogymna elata Recorded each day in primary forest and once in secondary growth.

C. atrata Up to four regularly in secondary forest and recorded in primary forest. Much commoner than C. elata.

Bycanistes fistulator Up to four daily in secondary growth.

B. cylindricus Up to three in secondary growth three times. Calls probably of this species once heard in primary forest.

Lybius hirsutus Up to two in clearing on three dates and in primary forest on four.

Gymnobucco calvus Frequent in secondary forest; groups recorded three times in primary forest.

Buccanodon duchaillui One singing in secondary growth on 9th and 10th.

Pogoniulus scolopaceus Frequent song and occasional sightings in both primary and secondary growth. Apparently common.

P. subsulphureus Up to two daily in clearing.

Trachyphonus purpuratus One singing in secondary growth on two dates and in primary forest on three.

Indicator maculatus Two together in canopy of primary forest on 8th.

Campethera nivosa One in primary forest on 9th.

C. maculosa One in primary forest on 10th.

Mesopicos pyrrhogaster Up to two occasionally in secondary growth; two in primary forest.

Hirundo rustica Influx on 8th after overnight rain, and present from then to 11th.

H. abyssinica Two over clearing on 5th.

Delichon urbica One over clearing on 8th.

Prionops caniceps Two in primary forest on 8th.

Dryoscopus sabini Fairly common in primary forest; recorded also in secondary growth.

Oriolus brachyrhynchus One seen (with 2 unidentified orioles) in primary forest.

O. nigripennis Seen in primary forest four times and in secondary growth twice; pair resident in camp clearing.

Dicrurus adsimilis Frequent in both primary and secondary growth.

Onychognathus fulgidus Three in primary forest and up to five in secondary growth.

Lamprotornis cupreocauda Singles and small groups recorded in primary forest.

Corvus albus Three over clearing.

Coracina azurea Frequent in both primary and secondary growth.

Pycnonotus barbatus Two in clearing.

Andropadus curvirostris Single birds twice in primary forest and once in secondary growth.

A. gracilis Fairly common in both primary and secondary growth.

A. gracilirostris Frequently recorded in both primary and secondary growth.

A. virens Two in secondary growth.

A. latirostris Two single birds in primary and secondary growth.

Ixonotus guttatus Groups recorded twice in primary forest.

Baeopogon indicator One on 5th and three on 9th over clearing.

Thescelocichla leucopleura Two groups heard, one in primary and one in secondary growth.

Phyllastrephus albigularis Twice recorded in mixed-species flocks in primary forest.

P. icterinus Up to ten twice recorded in primary forest.

Calyptocichla serina Two in secondary growth, twice.

Bleda syndactyla Several in bird-army in primary forest on 7th; calls thought to be this species heard frequently.

B. eximia One in secondary growth.

B. canicapilla Frequent in primary forest; twice recorded in secondary growth.

Criniger barbatus Up to seven each day in primary forest.

C. calurus Four in secondary growth and at least one in primary forest, all on 5th.

Nicator chloris A few songs heard in primary and secondary growth on four days.

Saxicola rubetra One in camp clearing on morning of 8th.

Alethe diademata Found in primary forest on four days and in secondary growth on one.

Neocossyphus poensis Up to two in primary forest on three days.

Stizorhina fraseri Two in primary forest on 10th.

Luscinia megarhynchos One in camp clearing on 7th.

Trichastoma cleaveri Calls identified later by Dr C. Chappuis, heard frequently in primary forest.

Phylloscopus sibilatrix Up to two in clearing on three days.

Apalis sharpei Pair with young on 7th, singles on 8th and 10th in primary forest (Macdonald & Taylor 1977).

Camaroptera superciliaris One in secondary growth.

C. chloronota One singing in clearing on two days.

C. brachyura One at camp on two days.

Eremomela badiceps A group in primary forest on three days and two groups in secondary growth on one.

Sylvietta virens One in secondary growth on 5th.

S. denti One in primary forest and three in secondary growth.

Macrosphenus flavicans One in primary forest.

M. concolor Frequent in primary forest, recorded in secondary growth.

Hylia prasina Common in primary and secondary growth.

Pholidornis rushiae One nest-building in primary forest on 10th.

Parisoma griseigularis Two records of pairs, in primary forest on 7th and 10th.

Muscicapa comitata Four in secondary growth on 9th.

Artomyias ussheri Four on 8th and one on 9th in clearing.

Fraseria ocreata At least five in primary forest on 7th and two on 10th; one in secondary growth on 5th and two on 9th.

Hyliota violacea Two males on 5th, a pair on 9th on edge of clearing (Macdonald & Taylor 1977).

Platysteira castanea Regular in mixed parties in primary forest; two in secondary growth.

Erythrocerous mccallii Five groups in primary forest and one in secondary growth.

Trochocercus nitens Two, one and one seen in primary forest.

T. nigromitratus One, four and one seen in primary forest (Macdonald & Taylor 1977).

Terpsiphone rufiventer Small numbers recorded each day in primary forest, but over 12 in one group on 7th.

Anthreptes fraseri Common in primary forest and also recorded in secondary growth.

A. collaris Frequent in secondary growth; recorded in primary forest on three days.

Nectarinia olivacea Fairly common in primary and secondary forest and bush.

N. adelberti One in clearing on 8th.

N. chloropygia Twice recorded in secondary growth and two in primary forest on 7th.

N. superba Pair in clearing.

Ploceus preussi Up to two in clearing.

P. tricolor Up to three in primary forest and two in secondary growth.

Malimbus scutatus One on 6th and several on 10th in primary forest.

N. nitens One or two each day in primary forest.

M. rubricollis One or two in primary forest on three dates; up to three around clearing most days.

M. malimbicus Two and three in primary forest.

Nigrita canicapilla Several singing birds recorded daily in primary forest; also in secondary growth.

N. bicolor One in primary and one in secondary growth.

N. fusconota Singing birds heard twice in primary forest and seen twice in clearing.

Spermophaga haematina One in primary forest.

The total number of species recorded during the week was 132. Of these 31 were recorded only in primary forest, 41 only in secondary forest and clearings, and 60 in both habitats. For individual species the distribution of records in primary and secondary habitats should not be taken as typical for the species in Ghana, as most species were recorded so rarely during our visit.

The above list will certainly not be a complete list for the park. We have no records of owls (Strigidae) or nightjars (Caprimulgidae) and some of the forest undergrowth birds such as Trichastoma spp. and some Turdinae were probably missed. In a preliminary list for the Park, M. Rucks (unpublished) recorded Ceyx lecontei, Cossypha cyanocampter, Stiphrornis erythrothorax, Cercotrichas leucosticta and Mandingoa nitidula (all netted) in addition to acceptable sight-records for other species that we failed to record (Pteronetta hartlaubi, Lophoaetus occipitalis, Alcedo leucogaster, Merops gularis, Tockus hartlaubi and Bycanistes subcylindricus). The total list is likely to be at least 160 species.

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STATUS OF CICONIIFORMES IN SIERRA LEONE

by G. D. Field

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Macdonald (1977) provided information on the status of the Ciconiiformes in the Cape Coast area of Ghana and gave a comparison with some other West African territories from Ivory Coast to Mid-West Nigeria. As there seems to be considerable variation between the stations, and the pattern of occurrence is clearly not yet fully understood in West Africa as a whole, it may be helpful to add the situation in Sierra Leone which lies between 280 and 520 kms west of the western border of Ivory Coast (between 06°55' and 10° N and between 10°16' and 13°18'W). Though straddling the forest/savanna boundary Sierra Leone is sufficiently compact to be treated as a unit and, although problems remain (particularly the status of some species during the rains) residence in the country over 14 years has enabled me to give a reasonably comprehensive picture of the position.

For the purposes of this paper the wet season can be taken as May to October and the dry season November to April. 'Breeding' refers to the laying of the egg, so that 'breeding Aug-Oct' (for instance) means that laying dates are known, or can be calculated from nestlings, for each of the three months, August, September, October.

LITTLE BITTERN *Ixobrychus minutus* A rains breeding migrant, common between May and November with a few records in December and April and none in January-March. Breeding Aug-Oct in seasonal wetlands, particularly in grass tussocks rising above the water.

AFRICAN DWARF BITTERN *I. sturmii* A local migrant, probably present in Sierra Leone all year, but during the dry season largely confined to shady streams and rivers and only flushed by chance. Between May and October it becomes conspicuous in seasonal swamps which contain thickets of trees; particularly in June birds fly about openly, standing exposed on the tops of trees and indulging in courtship flights. Breeding is probably mainly in July (well-grown juveniles in September).

TIGER BITTERN *Tigriornis leucolopha* A scarce forest resident, known from Freetown, the Liberian border and a captive bird in the extreme north. Breeding September (one record).

NIGHT HERON Nycticorax nycticorax Probably resident but no breeding is known. Birds occur in thickets in mid-swamp in small numbers (maximum 20 plus). With one September exception records are between December and June, but this is (largely?, wholly?) because the thickets cannot be approached during the rains and birds are hardly seen unless flushed at any time of year. The great majority of birds seen have been immatures.

WHITE-BACKED NIGHT HERON N. leuconotus Known from two sites only, a single bird flushed with Night Herons from the thickly 'bushed' banks of a small dam in the North-east (April, May) and another in the midst of a densely packed Squacco heronry on a river islet in the west (December). Probably a scarce resident.

SQUACCO HERON Ardeola ralloides A breeding resident. One site is known containing possibly 100 nests, an islet on one of the big rivers. Breeding Aug-Oct. Between July and October birds are absent from the swamps but common there for the rest of the year, possibly augmented by Palaearctic birds but there is no noticeable diminution in numbers between April and June when Palaearctic birds should be leaving.

CATTLE EGRET A. ibis A dry season migrant across the whole country, reaching Freetown in early November (occasionally late October) and leaving in mid June (latest date 26 June) with no obvious build up of numbers prior to departure. Presumably the arrival and departure dates one month later than over the other territories cited by Macdonald are to be correlated with the later onset and cessation of the rains here, and migration would seem to be a simple north-south movement.

GREEN-BACKED HERON Butorides striatus Resident and usually sedentary. Most common among the mangroves but found along the rivers and at lakes and pools right to the north. Uncommon on the more open swamps. Some breed solitarily in the mangroves or at isolated pools but most prefer to join a colony of other species like A. ralloides or E. gularis, tending to choose the higher and shadier positions within such colonies. Breeding: May, July-Oct.

BLACK HERON Egretta ardesiaca Status unknown but probably a non-breeding migrant. Recorded frequently between December and June (with odd single birds in November), usually in small parties except occasionally at drying swamp pools where up to 80 have occurred together. Much more commonly seen along the coast and lower river reaches than far inland.

REEF HERON E. gularis Resident. One breeding site is known, an islet off the Peninsula coast holding upwards of 50 pairs (July, Aug), and presumably other coastal stations exist. In the dry season common along muddy shores and estuaries, in smaller numbers along sandy or rocky shores and up the rivers, and comparatively uncommon on inland swamps except for occasional congregations at drying pools. Of the breeding birds about 8% are pure white. Out of the breeding season these are not normally distinguishable from E. garzetta.

LITTLE EGRET E. garzetta A dry season migrant over the whole country with some birds present on the coast through the rains. (These are non-breeding birds and not to be confused with white E. gularis. All E. gularis leave Freetown itself during the rains, whereas these birds remain there). It avoids rocky shores but usually outnumbers E. gularis on the mud (by three or four to one at Freetown), and inland is less a river species but far commoner on the swamps in company with the other white Egretta species.

YELLOW-BILLED EGRET E. intermedia A dry season migrant (November to July) to inland swamps, absent from the coast. Birds scatter singly, mixing particularly with A. ibis and E. alba, usually rather more abundant than the latter (old records do not differentiate between the two species).

GREAT WHITE HERON E. alba A dry season migrant to the coast between mid December and mid June, and to inland swamps between November and July with a few remaining through the rains and attaining the black beak of the breeding dress. (There is an old record of a large white heron breeding beside a newly formed dam in the north-east, but which species this refers to is unknown).

GREY HERON Ardea cinerea A dry season migrant throughout the country with a few birds remaining on the coast through the rains. The influx begins in October, mainly of young birds. Most common on the coast (maximum 45 together) but three or four will be seen on any large inland swamp and solitary birds on ricefields or at pools.

BLACK-HEADED HERON A. melanocephala Records are few but it probably occurs annually. Single birds have been seen in November, December, January (twice), February, April, and July, with two on one swamp at least from November to March. All records have been from inland swamps or dry grassland except for the November one when a bird remained for two weeks at Freetown feeding on coastal mud with A. cinerea. Unlikely ever to breed.

GOLIATH HERON A. goliath Status uncertain. Recorded rarely between November and May mainly on tidal rivers but once far inland in the north-east.

PURPLE HERON A. purpurea A solitary species of inland swamps (including ricefields and thickly vegetated Raphia swamps); also on lakesides and occasionally coastal mud. Recorded in all months between September and May, with no suggestion of a breeding population.

HAMMERKOP Scopus umbretta A rather uncommon resident both along the tidal rivers and inland in swampy grassland and along river valleys. Breeding (one record) March.

ABDIM'S STORK Ciconia abdimii An occasional passage migrant in May and June, known from Freetown and a river in the north-west.

WOOLLY-NECKED STORK C. episcopus Resident, the most widespread stork, breeding (Dec-Feb) in silk-cotton trees towering over savanna 'bush' or forest. Most common in saline swamps along the lower reaches of the rivers and in the central lowlands which are seasonally flooded, frequenting small water holes and ricefields rather than the large swamps where Anastomus occurs.

OPEN-BILL Anastomus lamelligerus Resident, breeding in the south, presumably during the rains but the breeding grounds are unknown to me. From December to April, occasionally as late as June, flocks of up to 100 are common on such large swamps as remain.

MARABOU Leptoptilus crumeniferus A dry season casual, recorded in January, February/March, March, April and June, single birds except for three in Feb/March, from widely separate localities right across the country including the forest zone.

WOOD IBIS Ibis ibis Resident, with one breeding colony known of some 40 nests in tall trees beside a village in the south (Jan, Feb). Otherwise it is not a very common species of the coastal belt, unrecorded between June and early November so that possibly it withdraws north for the rains.

SACRED IBIS Threskiornis aethiopica Status unknown but probably not breeding. Records are all between November and May, along estuaries and muddy coasts, far more plentiful in the north than the south but never in large numbers.

HADADA Bostrychia hagedash Presumably resident but no breeding is known. Recorded in all months except August and September (when ornithological activity is at its lowest) mainly from inland swamps and rivers in twos and threes, only reaching the coast and overlapping with Threskiornis in the extreme north-west.

OLIVE IBIS B. olivacea Very rare but probably resident in the south. However, practically nothing is known of it.

GLOSSY IBIS Plegadis falcinellus Apart from an unannotated mention by Bannerman the only record is of two at a swamp in the north-west in January.

AFRICAN SPOONBILL *Platalea alba* At least partially resident. Breeds on an offshore islet (Sept) but unfortunately the young are increasingly cropped for food by local fishermen. Confined to coastal areas and the system of lakes and rivers in the south. Massed flocks (up to 1000 birds) gather at one drying lake in April, far more than are likely to breed in Sierra Leone.

We thus have as certain rains breeders: *Ixobrychus minutus*, *I. sturmii*, *Tigriornis leucolopha*, *Ardeola ralloides*, *Butorides striatus*, *Egretta gularis* and *Platalea alba*; and as probables: *Anastomus lamelligerus* and *Bostrychia hagedash*. As dry season breeders: *Ciconia episcopus*, *Ibis ibis*, and provisionally *Scopus umbretta* (though here the nesting season may be prolonged). As dry season non-breeding visitors on present evidence: *Ardeola ibis*, *Egretta ardesiaca*, *E. intermedia*, *E. alba*, *Ardea cinerea*, *A. purpurea*, and *Threskiornis aethiopica*. As casuals of greater or lesser frequency: *Ardea melanocephala*, *Ciconia abdimii*, *Leptoptilus crumeniferus*, and *Plegadis falcinellus*; and with status unknown (though I suspect all are rare residents): *Nycticorax nycticorax*, *N. leuconotus*, *Ardea goliath*, and *Bostrychia olivacea*.

The situation thus seems to be more orderly than in Ghana, with for most species a regular and simple migration system between wet and dry seasons. The dangers of jumping to conclusions can be seen with e.g. *Ardeola ralloides*. If the breeding islet were not known one would judge it to be a dry season migrant, as the swamps on which it occurs for the rest of the year are wholly deserted although in some cases only a few miles from the breeding station. Similarly, *E. gularis* abandons Freetown during the rains to move thirty miles down the coast. It is still possible that such local movements may be found to occur among other heron species.

An interesting question is, where does *I. minutus* go in the dry season? Apart from Ivory Coast where it is said to be resident, all territories cited by Macdonald seem to have a wet season influx, although Elgood, Fry and Dowsett (1973) had no evidence of migration in Nigeria as a whole. As a bird of open, grassy swamps it cannot, like *I. sturmii*, simply become invisible in the dry season. Here it is a bird so obvious and easily flushed that it must genuinely migrate beyond the borders of Sierra Leone.

The *Ciconia abdimii* records are unexpected. Most western breeding birds migrate directly east-west across West Africa well north of latitude 10^0 and the birds seen here must either be totally misplaced, or an indication that some birds migrate over the forest zone, following the coast north to their breeding grounds.

Acknowledgements

I wish to thank the small band of faithful correspondents in Sierra Leone who keep me supplied with information: R. Pickering, J. B. Smart, and S. K. Todd. Without their help I should never have found some of the nest sites.

Reference

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NEW RECORDS FOR NIGERIA - White-breasted Tit *Parus albiventris* One bird seen on 16 April 1977 in the foothills of the Obudu Plateau in Cross River State. Head, chest and mantle black; belly, undertail coverts and stripe along wing white. With a small mixed bird party in open woods. The eye was black. The Black Tit *Parus leucomelas* has also been seen in this area; it is all black below, and the local race has a conspicuous yellow eye. I am familiar with *P. albiventris* from previous observations in Tanzania.

Banded Prinia *Prinia bardii* Two birds were seen on 17 April 1977 in a mountain forest ravine on the Obudu Plateau. They were well seen feeding and calling in thick foliage in a creek bed. General colour above grey brown, with white spots on wing coverts and along the long graduated tail. Below chest and flanks strongly barred brown. Bill dark, eye red. Throat grey, belly white. The call a rather shrill note repeated rapidly about eight times. This species is known to the observer from Mount Cameroon, and this is believed to be the first sighting in Nigeria.

Luhder's Bush Shrike *Laniarius luhderi* This quite unmistakable shrike has been seen on several occasions near the airport at Calabar, Cross River State. One was seen on 14 November 1976, two adults on 9 January 1977, and one adult and an immature on 1 April 1977. The birds skulk in deep shrubbery, and are rather quiet. The adult is black above, excepting the cap, which is bright buffy orange, and a white shoulder stripe. Below, the throat and chest are orange, the undertail coverts white. The immature is olive brown above, with a wide yellowish shoulder streak, and a dull rufous tail. Throat and chest are yellowish. These field notes match the description in Praed & Grant (1973), and the identification is clear. Two other shrikes inhabit the same shrubbery, *Tchagra senegala* and *Lanius collaris*, but neither resemble the present species. It is of interest that the White-chinned Prinia *Prinia leucopogon* inhabits the same area, the range also restricted in Nigeria to the south east corner.

Paul Mackenzie

LESSER GOLDEN PLOVER IN GHANA - On 4 October 1977 at Nakwa Lagoon, Ghana (05°13'N, 00°56'W) I flushed from the water's edge two Ringed Plovers *Charadrius hiaticula* and a distinctly larger unfamiliar plover. The latter looked very similar to but 'wrong' for a Golden Plover *Pluvialis apricaria*. After trying unsuccessfully to locate the bird where it landed, I was returning when it flew from the original pool with a small sandpiper *Tringa* sp. and a Kittlitz's Sand Plover *C. pecuarius*. As on the first occasion it towered to some 40-50 m a few hundred metres from the pool, before gliding down to land close to me. I watched it on the ground and in two brief flights at about 20 m with a pair of Greenshank *T. nebularia* for several minutes before all three birds took off. The plover was not seen again.

On the ground the bird looked like a slender greyish Golden Plover with noticeably longer dark legs, a longer neck and a long tapering silhouette produced by the extension of the wings beyond the tail. The bill was black and the head appeared light because of the ill-defined pale area over the eye, on the forehead and on the lores. The upperparts were dark with clear grey-buff edges to the feathers, appearing much greyer than in Golden Plover and more like Ruff *Philomachus pugnax*. The breast was lightly streaked, especially on the sides, but often appeared uniform pale buff. Belly and under tail-coverts were white. An indistinct pale bar showed across the primaries in flight, similar to but less contrasted than in the Golden Plover. Tail and rump were dark, the former narrowly barred darker. Before rising and after landing it held its wings momentarily vertically, showing clearly on three occasions the grey under-wing coverts shading to smoky grey axillaries.

The build and colour of the underwing identified it as a Lesser Golden Plover *Pluvialis dominica* ssp. While it would be wrong to identify the race positively from a field observation, the greyish appearance and large size, approaching that of a Greenshank, together with the western location suggest the nominate American form *dominica* rather than the Siberian *fulva* (Hollom 1968, The Popular Handbook of British Birds, Witherby).

M. A. Macdonald

APPEAL FOR INFORMATION ON WAHLBERG'S EAGLE

The Wahlberg's Eagle (*Aquila wahlbergi*) is a medium-sized raptor, which in southern Africa is commonly seen in its breeding season from August to February. During this period it is possibly the most numerous breeding raptor in the sub-continent. However when it leaves the breeding area with its young in March - April, little is known of where it moves to. In southern Africa Peter Steyn suggests they fly north, while in Kenya Dr Leslie Brown suggests that they fly south.

In an attempt to obtain some information on the movements of this Eagle we are embarking on a colour tagging scheme in which a coloured strip of Darvic plastic is fixed to the "wrist" section of the wing. The tag will be visible both in flight and while the bird is perched. The main colour of the tag will represent the area in which the bird was captured and tagged, while its individual number will be engraved on the tag in a contrasting colour. This will allow a bird to be traced to a particular area, while closer observation will enable individual recognition of the bird.

We are therefore appealing to all bird watchers in the Central African region to keep a lookout for any Wahlberg's Eagles which may have a coloured tag attached to one of its wings. The information desired is: the location of the sighting, colour of the tag and on which wing, and the individual number engraved on the tag.

Anyone seeing a marked Eagle is asked to kindly send information to A. J. Anthony, c/o 180 St John's Road, Edinburgh, EH12 8BE, Scotland, UK.

All correspondence will be acknowledged.

CORRIGENDUM

Dry Season Birds at Enugu and Nsukka. Bull. Nigerian Orn. Soc. 13 (43) (1977), p.62 :

My identification of *Quelea quelea* at Enugu is probably in error for nonbreeding males of *Vidua macroura*. Pending further observations this record should therefore be ignored and *Q. quelea* deleted from the Enugu list.

S.G.Cowper

NOTICE TO CONTRIBUTORS

The BULLETIN publishes papers, short notes, reviews, letters and illustrative material. Contributions should be typed on one side of the paper with double spacing and wide margins. Wherever possible papers first should have been submitted to at least one ornithologist or biologist for critical scrutiny.

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STANDARD WORKS WHICH NEED NOT APPEAR IN REFERENCE LISTS

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Bull. Nigerian Orn. Soc. 14(45) May 1978

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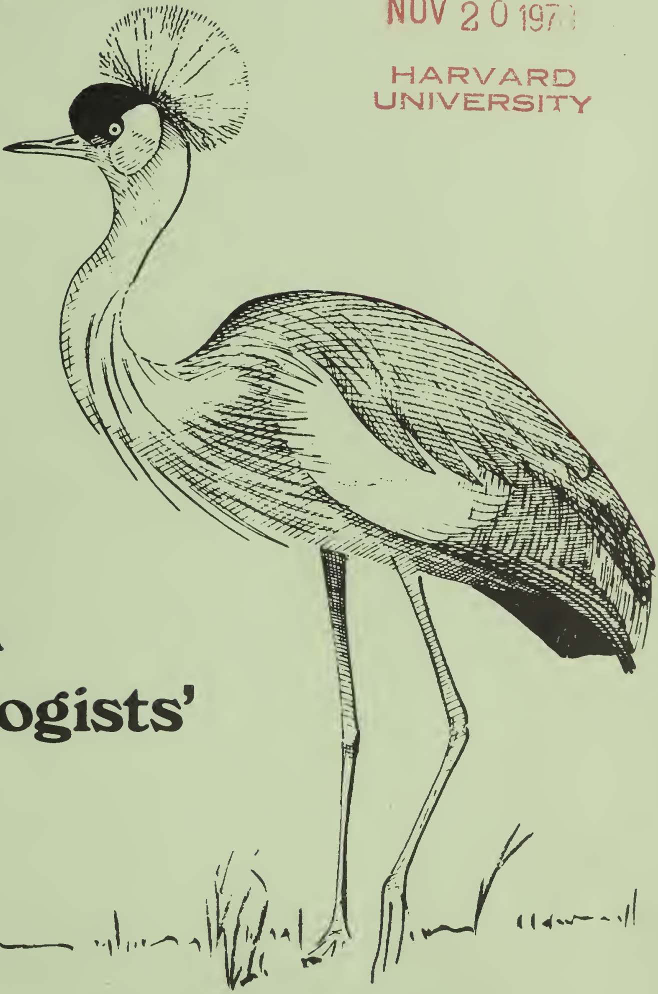

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BREEDING BIOLOGY OF THE EGYPTIAN PLOVER PLUVIANUS AEGYPTIUS

by Thomas R. Howell

Received 9 August 1978

The following is a summary of a study which will appear in full in the University of California Publications in Zoology series, probably in the latter part of 1979. This preview is offered now, in view of the great interest to those concerned with African ornithology which the Egyptian Plover has long evinced.

The Egyptian Plover Pluvianus aegyptius (Glareolidae; Cursoriinae), breeds only in tropical Africa along rivers where sandbars are exposed by low water during the dry season. This species is most noteworthy on account of two unusual behaviour patterns often attributed to it: picking food particles from the jaws and teeth of basking crocodiles; and burying its eggs in the sand and leaving them to be incubated by solar heat. The first pattern, accounts of which date back to Herodotus, is still not documented incontrovertibly and I never saw it take place. The second pattern is more complex than is stated and was a principal subject of my study.

I studied a population of Egyptian Plovers at Gambela, along the Baro River, Ilubabor Province, southwestern Ethiopia, from 24 January to 6 April, 1977. The species is strikingly patterned and the sexes are indistinguishable in colour, vocalizations, and size; adults weigh about 78 g during the nesting period. Most birds were paired and territorial at the time of my arrival. Both sexes defended a territory on a sandbar island by threat displays and fighting, and they attempted to drive off all other Egyptian Plovers and all potential competitors and predators. Courtship activity and precopulatory displays are simple and minimal. The nest is a scrape in the sand-gravel substrate, and both sexes make many preliminary scrapes before one is finally chosen. The usual clutch at Gambela was 2 or 3 eggs (one single-egg clutch); the mean egg weight is 9.5 g. From the first, eggs are covered with sand (by use of the bill, not the feet) to a usual depth of 2-3 mm above their upper surface. The parents in turn sit on the nest most of the day and may sometimes bring the egg surface in contact with the incubation patch by scraping away sand with the feet while sitting. Whenever an adult leaves the nest it quickly throws sand over the site with the bill. At night the eggs are about two-thirds uncovered and continuously incubated. During the six hottest hours of the day, each adult frequently soaks its ventral feathers in the river and then returns to settle on the buried eggs, thus keeping them surrounded by wet sand. The soaking is a stereotyped activity and is done only after the first egg is laid and when ambient temperatures are high.

The incubation period is about 30 days, and chicks hatch from eggs under the sand. Chicks are highly precocial and leave the nest permanently by the end of the day of hatching. Some food is brought by the parents, which also expose food for the chicks by stone-turning and other foraging methods. At any approach of danger, chicks crouch down and are completely covered with sand by a parent in the same manner that eggs are covered. Buried chicks are also wetted with soaked ventral feathers. Chicks remain immobile if excavated and gently handled but will suddenly flee if extensively manipulated. Even juveniles up to three weeks of age may be covered with sand by a parent. By the age of about four weeks, juveniles have acquired contour feathers with the adult colour pattern but still do not fly. I estimated the age of first flight as about 35 days.

I measured the incubation temperature (T_E) using a fresh egg implanted with a thermocouple as a replacement for one of a pair's own eggs, and simultaneously recorded relevant ambient temperatures. On a typical day, the parents attend the buried eggs only occasionally during the first three hours after sunrise (0700 hrs). A balanced combination of body heat, solar heat, and heat retained by the sand keeps T_E within appropriate limits. The birds often poke the bill in the sand around the eggs, possibly testing the temperature. By about 1000-1030 hrs, air temperature in the shade approaches 40^o and continues rising to peaks of 45-46^o (over 50^o in sun). For about the next six hours the adults cool the eggs by wetting them every few minutes with soaked ventral feathers (water temperature 27^o). As shaded air temperatures and sub-surface dry sand temperatures often exceed 45^o, mere shading of the buried eggs would not be enough. By about 1600 hrs solar heat begins to decline and the birds become less attentive and cease soaking. T_E sometimes briefly reached 42^o, but all undamaged, non-implanted eggs in monitored nests hatched. I estimated mean incubation temperature over 24 hours as 37.5^o.

Birds' eggs are heaviest at the time of laying and lose weight at a relatively constant rate throughout the incubation period. The decline in weight is the result of loss of water vapour through the microscopic pores in the eggshell. The rate of water vapour loss is determined primarily by the porosity of the shell and the difference in water vapour pressure inside and outside the shell, which is in turn influenced by incubation temperature and the humidity of the immediate surroundings of the egg. The latter point was of particular interest as the eggs are usually covered by soaking wet sand for about 6 hours out of each 24. I found that the daily rate of weight loss (= water vapour loss) was much lower than predicted on the basis of the size of the egg, but that the porosity of the eggshell was not reduced. I therefore hypothesize that the soaking of the eggs greatly reduces their daily water loss and thus permits a long incubation period without causing excessive dehydration. I further hypothesize that the long incubation period (presumably genetically determined) is adaptively advantageous by allowing enough time for pre-hatching maturation to produce a highly precocial chick, as is necessary for survival on an open sandbar island. I propose that concealment was the initial adaptive advantage to egg-burying, and that the combination of burying and wetting enables the Egyptian Plover to nest in a habitat where the eggs would otherwise be lethally overheated.

The species' conspicuous pattern makes concealment of the incubating adults impossible, but covering-wetting of the eggs makes it possible for the adults to leave the nest safely while distracting or attacking any approaching predators or competitors. The display of striking plumage patterns is often effective in repelling adversaries without a fight. The success of Pluvianus aegyptius - the only species of courser to colonize the fluviatile habitat - is attributable to its methods of incubation and chick care, which are unique among birds.

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WEIGHT, PRENUPTIAL MOULT AND FEEDING OF BISHOP BIRDS IN NORTHERN GUINEA SAVANNA IN GHANA

by Nicholas C. Davidson

Received 20 March 1978
Revised 20 April 1978

INTRODUCTION

Of the four species of bishop birds that occur in Mole National Park, Ghana, the two smaller ones, Yellow-crowned Bishop Euplectes afer and Red Bishop E. orix, were sufficiently common for me to make a detailed study during a visit in July and August 1975. That is the middle of the wet season, and I have added further information collected during the same season in 1974 and 1976. Both species make an early rains migration (Jones & Ward 1977) and some birds were probably on passage during the study.

Prenuptial moult of bishops in Nigeria has been discussed by Fry (1970) and in Rhodesia by Brooke (1966). Few data have been published about E. afer and information on weight is rather fragmentary (e.g. Britton & Dowsett 1969, Fry 1970, Day 1975, Greig-Smith & Davidson 1977).

METHODS

Birds were mist-netted whilst feeding on weed grasses in disturbed vegetation around park headquarters (09°15'N, 01°51'W) and fitted with colour rings. The feeding area was 400 m away from a marsh in which many of these birds subsequently nested. Some birds were also netted in this marsh, and in the surrounding wooded savanna. Weights were measured with a Pesola spring balance accurate to 0.1 gms. The length of wing, tail, tarsus and exposed culmen were measured for each bird.

Body moult was recorded separately for upperparts, underparts and head on a scale of four : (1) predominantly old feathers; (2) approximately half new feathers; (3) predominantly new feathers; and (4) moult complete. For analysis the three body zones were summed, giving a maximum moult score of 12. On capture I was unable to distinguish males in non-breeding plumage from females; although some were subsequently sexed by size, these have not been analysed for fear of bias by separating only the larger non-breeding males.

Information on food and feeding was collected by direct observation of feeding flocks, and some samples were taken by dissection of the gizzard and crop of birds netted in feeding flocks.

WEIGHT AND DIMENSIONS

Weights and dimensions are listed in Table 1. In each species, males and females differ significantly in weight, wing lenth and tail length (Student's t-test, all $P < 0.001$), and tarsal length (both $P < 0.05$). *E. afer* males average 10.5% larger than females in weight and 3% larger in wing length; likewise *E. orix* males are 11% and 3.5% larger than females. This is close to the 10% sexual dimorphism in weight found by Fry (1970) for Nigerian *E. orix*. Neither species is sexually dimorphic in bill length.

Table 1 *Euplectes* weights and dimensions, Mole National Park, 1974 and 1975. Each value is the mean ± 1 Standard Error

	n	WEIGHT (gms)	WING (mm)	TAIL (mm)	TARSUS (mm)	BEAK (mm)
E. afer ♂	81	14.7±0.30	58.0±0.15	32.1±0.15	16.6±0.14	11.9±0.09
" ♀	44	13.9±0.19	56.1±0.20	30.1±0.31	16.0±0.18	12.0±0.09
E. orix ♂	30	17.0±0.18	62.7±0.27	35.7±0.45	18.2±0.22	12.0±0.28
" ♀	20	15.5±0.49	58.1±0.65	31.9±0.57	17.4±0.31	11.8±0.22

E. orix is significantly heavier and has a longer wing, tail and tarsus than *E. afer* (all $P < 0.001$), with differences of between 11% (mean weight) and 6.5% (mean wing length). There is no difference in the bill length of the two species. The weights are very similar to those given by Fry (1970) for Mole and Zaria, Nigeria (11°10'N,07°40'E).

WEIGHT CHANGES

Figs. 1 and 2 show the daily weight fluctuations of *E. afer* and *E. orix*. Males of each species gained weight during the day, which is substantiated by four *E. afer* recaptured on different days. *E. afer* males gain weight in the early morning, fall at noon, and increase again during the afternoon; their afternoon weight increase (4.5%) is greater than the prior decrease (2.6%). Similarly, *E. orix* males gain weight in the late afternoon by 5.5%. *E. afer* females gained weight early in the morning, but thereafter did not change; nor did female *E. orix* show any significant weight changes. Three female *E. afer* decreased in weight during the day (but as they were same-day recaptures their weight loss reflects lost feeding time and I discount the values), and one female gained weight. Weights of *E. orix* netted at Mole in July and August 1977 (P. Fisher pers. comm.) show the same pattern of late afternoon weight gain in males and no change in females.

To assess seasonal weight changes it is necessary to exclude any variation due to daily weight change. Consequently, weights have been standardised to the midday level (1200 - 1400 GMT) by the addition or subtraction of the mean percentage differences. *E. afer* males (Fig. 3) lost weight significantly during July 1975 and the first half of August 1974. Similarly, *E. afer* females (Fig. 4) lost weight in July 1975 and early August 1974. Four of the five recaptured *E. afer* males decreased, with adjusted weight losses of up to 14.1% in 11 days. In different individuals weight losses varied between 0.41 gms/day and 0.15 gms/day. A single recaptured *E. afer* female lost 6.3% in four days or 0.23 gms/day. Neither sex of *E. afer* lost weight during July 1974, and no significant seasonal weight changes were detected for either male or female *E. orix*. Ward (1965) shows an early rains weight loss in both sexes of the weaver *Quelea quelea*.

There was no correlation between weight and prenuptial body moult score in males of either species.

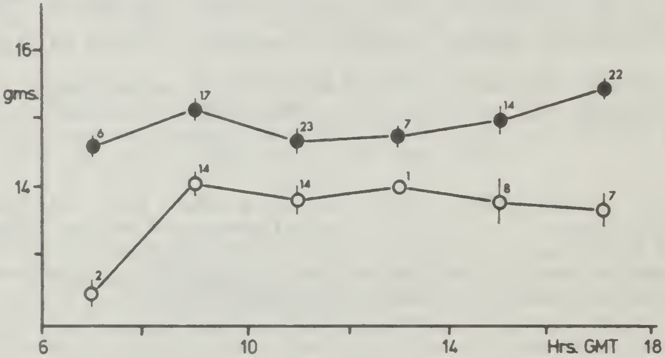

Figure 1 Daily weight variation of *E. afer* males ● and females ○ in Mole National Park, Ghana in July and August 1974 and 1975, per two-hour period. Each point is the mean ± 1 Standard Error; numbers are sample sizes. Significant changes (Student's t-test): male: morning gain $t = 2.48$ $P < 0.05$; noon loss $t = 3.92$ $P < 0.001$; afternoon gain $t = 5.31$ $P < 0.001$; female: morning gain $t = 2.41$ $P < 0.05$.

PRENUPTIAL BODY MOULT

Males in prenuptial moult change from streaked brown non-breeding plumage to bright red and black (*E. orix*) or yellow and black (*E. afer*) breeding plumage. The beak changes from horn-coloured to black during the moult period. Only body tracts are moulted: no wing or tail moult was noted during the study, and females do not undergo a prenuptial moult.

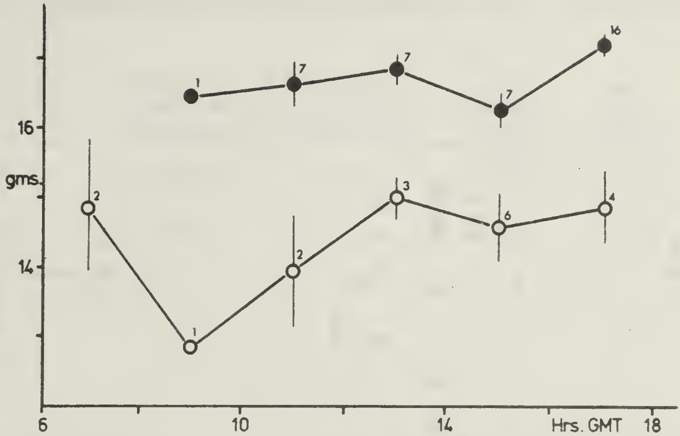

Figure 2 Daily weight variation of E. orix males ● and females ○ . Legend as in Fig. 1. Significant change (Student's t-test): male: afternoon gain $t = 2.43$ $P < 0.05$.

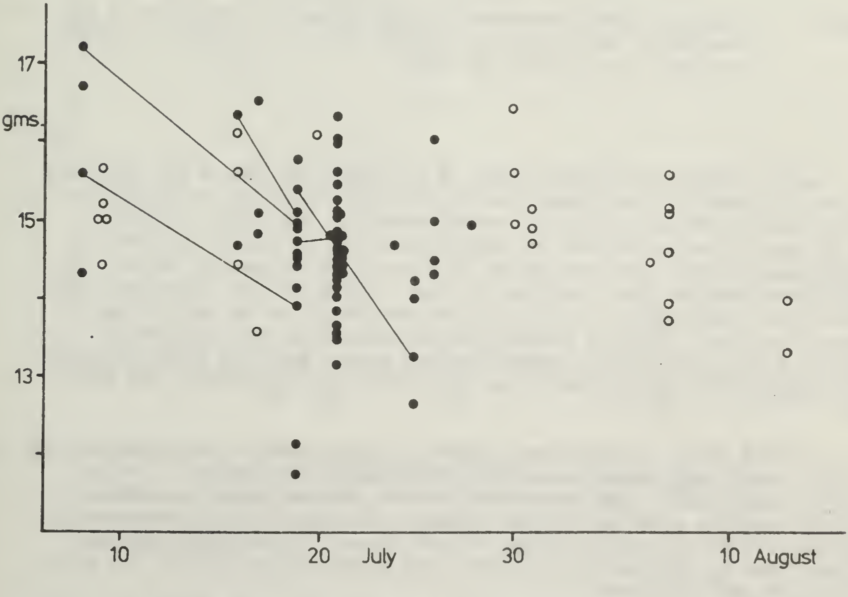

Figure 3 Seasonal weight changes of E. afer males in 1974 ● and 1975 ○ . Weights are adjusted for daily weight variation (see text). Solid lines are recaptures. Correlation coefficients: August 1974 $b = -0.184$ $P < 0.05$; July 1975 $b = -0.079$ $P < 0.05$.

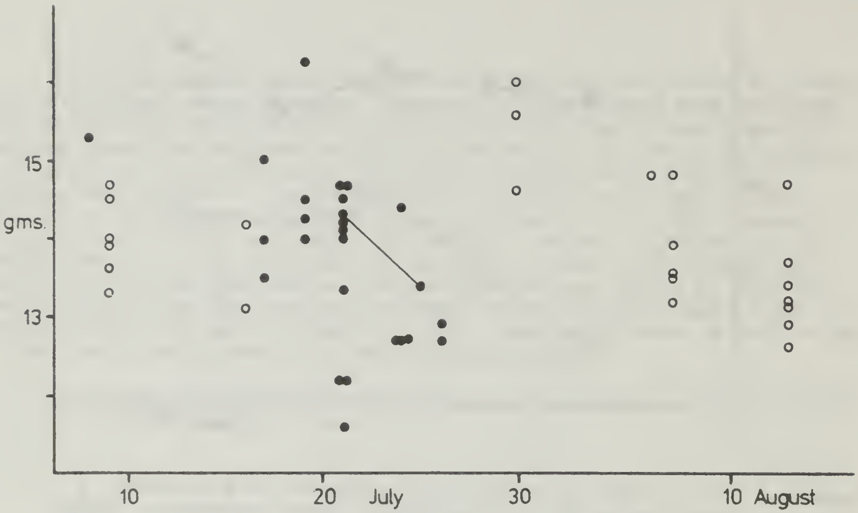

Figure 4 Seasonal weight changes of E. afer females. Legend as in Fig. 3. Correlation coefficients: August 1974 $b = -0.141$ $P < 0.001$; July 1975 $b = -0.156$ $P < 0.01$.

Moult scores are plotted in Fig. 5 (E. afer) and Fig. 6 (E. orix) and the results from 1975 are summarised in Table 2. Moult in the population was estimated from the population means, assuming linearity. In 1975, E. afer moult started in mid-June and finished at the end of July, whilst E. orix moult lasted from the end of June to the third week of August. Linear extrapolation from the date of first completed moult indicates that the earliest individuals of both species began moult at the end of May/ beginning of June. In both species, moult begins with the underparts, followed a week later by the upperparts and head. Moult is first completed on the head, with the upperparts and underparts finishing about two days later.

In 1976 (A. H. Cuthbert pers. comm.), E. afer moult timing was similar to 1975, but E. orix moult was a fortnight earlier than in 1975. Of two E. orix ringed in 1975 and recaptured in 1976, one was also two weeks more advanced, but the other had similar timing. A single E. afer recaptured in 1976 also indicates similar timing in both years. Limited data from 1974 indicate that E. afer moult was a fortnight earlier than in 1975, but that E. orix had similar timing.

Table 2 Summary of *Euplectes* male prenuptial moult, Mole National Park, 1975

	Estimated duration (population)	Estimated duration (recaptures)	First completed moult	Last moult started	Individual variation of timing
E. afer	45 days	36, 44 & 44 days	16 July	21 July	7 weeks
E. orix	52 days	37 days	19 July	28 July	8 weeks

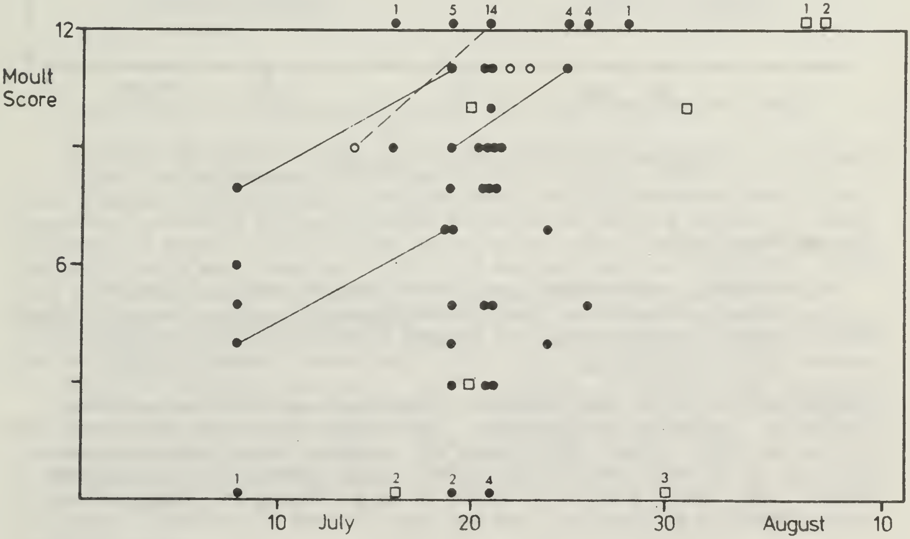

Figure 5 Prenuptial body moult of male *E. afer* in 1974 □ , 1975 ● and 1976 ○ . Solid lines are 1975 recaptures, and dashed lines are birds ringed in 1975 and recaptured in 1976. Numbers against scores of 0 and 12 are sample sizes - these have been omitted from the analysis.

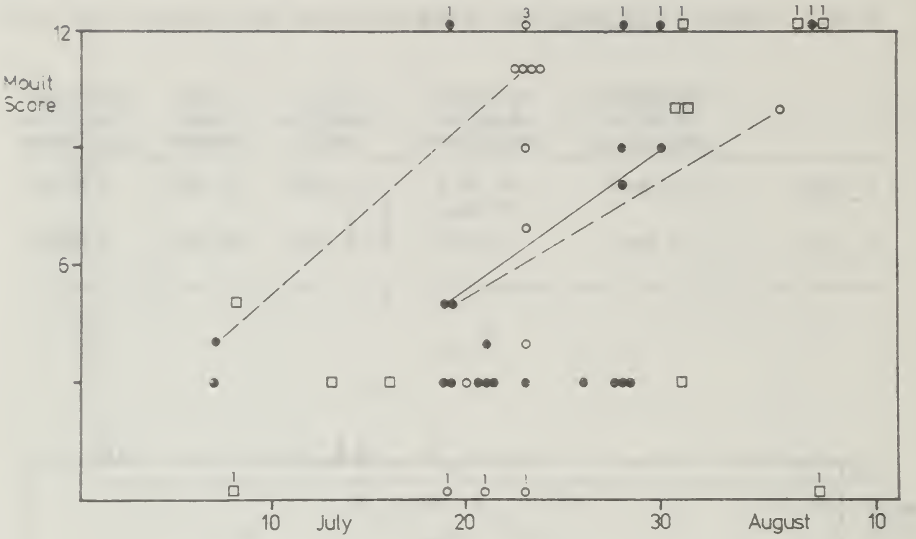

Figure 6 Prenuptial body moult of male *E. orix*. Legend as in Fig. 5.

FOOD AND FEEDING

Both bishop birds joined large mixed species feeding flocks of 'finches' composed mainly of firefinches *Lagonosticta senegala*, *L. rufopicta*, waxbills *Estrilda caerulescens*, *E. melpoda*, cordon-bleus *E. bengala*, canaries *Serinus mozambicus* and a few of the large bishops *Euplectes macrourus* and canaries *S. gularis*. These flocks were feeding on the seeds of abundant weeds and grasses in areas of disturbed vegetation around human habitation. Sometimes *E. afer* and *E. orix* formed single-species flocks (5 of 57 observations). When a mixed flock was disturbed, each bishop species dispersed on its own, whilst estrildine finches dispersed as mixed groups. Woodall (1971) noted a definite leader (a male in breeding plumage) in a feeding flock of *E. orix*.

Table 3 lists the plant species from which bishops were seen to take seeds. *Sporobolus pyramidalis* and *Hyperthelia dissoluta* are tall grasses (2 - 2.5 m high when fruiting) and generally form monospecific stands, while the other species seldom grow taller than 1 m and grow in mixed stands. Eight gizzard samples were taken on 21 July 1975 (two males and two females each of *E. afer* and *E. orix*, all with enlarged gonads), and all contained *Brachiaria lata* seeds. All *E. afer* and one male and two female *E. orix* gizzards contained *Digitaria ciliaris*, and one male and one female *E. afer* contained *Tridax procumbens*. No gizzards contained insect remains.

Table 3 Food plants of bishops in Mole National Park, July and August 1975

Gramineae (grasses)

Brachiaria brachylopha
B. jubata
B. lata
Cymbopogon sp.
Dactyloctenium aegyptium
Digitaria ciliaris
Hyperthelia dissoluta
Sporobolus pyramidalis

Cyperaceae (sedges)

Cyperus dilatatus
Mariscus alternifolius

Herbs

Boerhavia diffusa
B. erecta
Tridax procumbens

Both sexes of *E. afer* and of *E. orix* fed on all the species listed.

Four feeding methods were noted for both bishops. When feeding on small plants, birds perched on the stem until the inflorescence bent to the horizontal and could be reached while the bird was perched upright, a method described by Woodall (1971). When the stem bent double under the weight of the bird, seeds were taken while the bird was hanging head downwards. Birds also perched on an adjacent stem to reach an inflorescence. Seeds of the larger grasses were taken by climbing vertically up the stem to the inflorescence. These methods are typical of those described by Skead (1975) for estrildine finches.

Feeding activity can be gauged by the number of birds netted throughout the day (Evans 1966). To reduce bias I standardised the number of drives per 2-hour period and the net length. The results are shown in Table 4. Both *E. afer* and *E. orix* showed highly significant diurnal variation in the time of capture, and they fed mainly in the morning and late afternoon. I found no sexual difference in feeding times nor any interspecific difference in feeding periods.

DISCUSSION

The 1975 moult duration was about the same as Fry (1970) found for *E. orix* in northern Nigeria (6 - 7 weeks), where however moult started earlier, in the first week of May. The asynchrony I detected conforms with

Table 4 Numbers of E. afer and E. orix netted per two-hour periods from feeding flocks

Hrs. GMT	0801-1000	1001-1200	1201-1400	1401-1600	1601-1800
E. afer ♂	22	7	3	4	22
" ♀	9	5	1	2	7
" total	31	12	4	6	29
E. orix ♂	6	0	1	2	14
" ♀	1	2	2	2	2
" total	7	2	3	4	16

Netting effort from 0600-0800 GMT was light and has been omitted. Significant differences between time-periods: E. afer $X^2 = 42.71$ $P < 0.001$; E. orix $X^2 = 25.66$ $P < 0.001$.

other findings: two months in E. orix (Skead 1956) and at least five weeks in E. nigroventris (Moreau & Moreau 1938). Brooke (1966) and Woodall (1971) suggested that the timing of moult and breeding in E. orix is influenced by rainfall and its consequent effect on vegetation growth. Similarly, Whybrow (1950) recorded delayed breeding by E. hordeacea in drought conditions. At Mole, although some rain falls in April, heavy rains do not start until June (Maze 1970). The moult data suggest that most E. afer start moulting in mid June and most E. orix in late June. Jones & Ward (1977) have shown that at Maiduguri, northern Nigeria, these small bishops migrate south at the start of the rains; at Mole they became more abundant at the beginning of July 1975, suggesting arrival with an early-rains migration (but see Elgood, Fry & Dowsett 1973). Unfortunately, information on seasonal changes in bishop numbers at Mole has not been collected (see Greig-Smith 1977). Whilst the start of the rains and the consequent food shortage (see Ward 1965) influence migration and probably moult (Jones & Ward 1976) and lead to an onset of gametogenesis (Immelmann 1970) in related species and presumably bishops, it seems unlikely that subsequent rainfall and vegetation growth in the breeding area will have influenced the timing of moult and breeding, since the birds are absent on migration for much of this period. Jones & Ward (1976) suggest that not only does individual body condition influence breeding time in the weaver Quelea quelea, but also that preparatory changes such as prenuptial moult are under endogenous control. That would account for the great asynchrony of moult in the present study. The differences in the timing of moult in different years may be related to the timing of the onset of the rains: for example, the rains in 1974 were later than in 1975, so were E. afer moult and weight loss.

The causes of the pattern of weight changes are not clear. The seasonal weight losses in E. afer may be due to the loss of migratory fat reserves (Jones & Ward 1977) after return to the breeding grounds. Alternatively it may be due to a change in foraging behaviour resulting in less food storage in the crop once breeding commences. However, the regular presence of colour-marked birds on feeding areas close to the breeding ground makes this unlikely. Further, there was no weight difference between birds netted in the breeding marsh and those from feeding areas. The high weights of E. afer during July 1974 may indicate that at least some birds were on passage to breed further north (e.g. Pearson 1971). Similarly, the steady weight of E. orix in both years may also be due to passage birds, and appears correlated with the later moult and breeding (pers. obs.) compared with E. afer.

The morning and late afternoon weight gains by males of both species are similar to those of Q. quelea (Ward 1965), attributed to the replacement of food used during the night-time and midday periods of inactivity. The gains by bishops occurred during the periods of peak foraging activity and are probably the result of daily fattening (e.g. Ward 1969) and food storage in the crop (e.g. Newton 1969). Why females do not gain weight in the late afternoon is unclear - perhaps because they need more protein reserves than males for breeding (see Jones & Ward 1976).

The size differences between the two species are of the same magnitude as intraspecific sexual differences, and there is considerable overlap in dimensions. That the two species have the same sized beaks emphasises their similarity in food and feeding habits.

ACKNOWLEDGEMENTS

I am grateful to Dr E. O. Asibey and the Ghana Game and Wildlife Department for permission to work in Mole National Park, and for much assistance. The work was financed by grants to the 1st and 2nd Aberdeen University Expeditions to Ghana. Mr A. H. Cuthbert allowed me access to data collected during the 3rd Aberdeen University Expedition to Ghana in 1976, and Mr P. W. Greig-Smith supplied additional information from 1975. Mr J. B. Hall of the University of Legon, Ghana kindly identified the plant species. Dr P. R. Evans and Messrs P. W. Greig-Smith and M. W. Pienkowski made valuable criticisms of an earlier draft of this paper.

SUMMARY

Wet season weight, prenuptial moult and feeding of the bishops Euplectes afer and E. orix were studied in Mole National Park in 1974 and 1975. Weights and dimensions are tabulated. Males were heaviest in mid-morning and late afternoon, corresponding with feeding peaks. Females gained weight before noon but not after. No feeding segregation was found. E. afer lost weight during the mid wet season. Male prenuptial moult took 45 days in E. afer and 52 days in E. orix, with the first individuals starting at the end of May, and with asynchrony of at least four weeks from the mean. The timing of the seasonal weight loss and prenuptial moult synchronised with the start of the rains, two weeks earlier in 1974 than 1975.

RÉSUMÉ

Le poids en saison humide, la mue prénuptiale et le comportement alimentaire des Euplectes Euplectes afer et E. oryx ont été étudiés en 1974-75 au Parc National du Mole. Les poids et dimensions sont exposés dans les graphiques. Les mâles sont plus lourds au milieu de la matinée, et en fin d'après midi, en accordance avec les périodes de prise de nourriture. Les femelles gagnent du poids avant midi, mais non après. Aucune ségrégation n'a été notée pendant la prise de nourriture. E. afer perd du poids durant la saison humide. La mue prénuptiale dure 45 jours chez E. afer, 52 jours chez oryx, les premiers individus commençant fin mai, avec une asynchronie d'au moins 4 semaines par rapport à la moyenne. Il y eut coïncidence de la perte de poids saisonnière et de la mue avec l'arrivée des pluies: deux semaines plus tôt en 1974 qu'en 1975.

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RECORDS OF PALAEARCTIC MIGRANTS IN GHANA

by M. A. Macdonald

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This paper lists my records of Palaearctic migrant birds in Ghana from December 1975 to July 1978. I have already dealt with the Ciconiiformes (Macdonald 1977) and waders (Macdonald 1978), and I include here only those recently-collected data about them that alter or extend my conclusions. For other species, if individual records are detailed they embrace all of my records. For some common species only extreme dates and a general statement of status and distribution are given.

Ardea cinerea Early records at Nakwa 4 Oct 1977 (six birds) and Iture 8 Oct 1977 (one bird). (For localities see Fig. 1).

Anas acuta Seven at Nakwa on 18 Dec 1977 and one there on 11 Feb 1978.

Circus macrourus A sub-adult male at Amedzofe on 8 Aug 1976; a 'ringtail' (and therefore possibly *C. pygargus*) at Nakwa on 13 Jan 1978.
C. aeruginosus Seven records between 3 Jan and 6 May (Jan three, Feb two, Mar and May one each) from Nakwa, Atsotsuare and Fryfusu.
Circaetus gallicus One Cape Coast 17 Dec 1975, one near Kintampo 2 Apr 1976, one Mole 5 and 8 Apr 1976, two east of Accra 22 May 1976. It is possible that some of these, especially the May record, refer to the African *C. g. beaudouini*. An unidentified large *Circaetus*, probably this species, was seen at Nakwa on 12 Mar 1978.
Milvus migrans (migrans) Single black-billed pale-headed birds at Mole on 5 Apr 1976 (Taylor & Macdonald 1978) and Cape Coast on 15 May 1976.
Pernis apivorus Eight records between 8 Aug and 15 Apr (Aug one, Oct one, Nov one, Dec two, Feb one, Apr two) from New Debiso, Daboase, Akutuase, Tafo, Accra and Amedzofe.

Pandion haliaetus Six records between 15 Dec and 3 Jun (Dec two, Mar one, Apr to Jun one each) from Elmina, Nakwa, Accra Plains and Amedzofe.

Falco subbuteo An immature at Mole on 6 Apr 1976 (Taylor & Macdonald 1978).
F. tinnunculus One Cape Coast 20 Dec 1975, one Damongo 10 Apr 1976, two Mole 8 Jan 1978, about two 90 km south-west of Tamale 10 Jan 1978, one Atsotsuare 6 May 1978. The May bird was not seen well and the possibility that it was the African race *F. t. rufescens* was not excluded.

Haematopus ostralegus Two at Weija on 11 Feb 1978, one Shama 10 Mar 1978.
Numenius arquata One at Elmina on 15 Jan 1978.
Limosa limosa One at Elmina on 12 Nov 1977.

Tringa ochropus One at Ankaful on 15 Jan 1978, few Tafo 29 Jan 1978.

Gallinago media One at Ankaful on 4 Feb 1978.

G. gallinago Three at Tafo on 29 Jan 1978.

Calidris alpina One at Elmina, 12-14 Mar 1978.

Philomachus pugnax One at Elmina on 12 Nov 1977 and 13 Mar 1978.

Stercorarius pomarinus Not uncommon offshore in the Cape Coast area during the dry season. Highest concentration off Elmina; most in immature plumage.

S. parasiticus Occurred together with the last species but probably generally less common.

Larus ridibundus One at Elmina on 11 Jan 1976 and one at Weija on 11 Feb 1978; both sub-adults.

L. fuscus Two adults and a first-winter bird at Weija on 14 Oct 1976; two ads. there on 11 Feb 1978. Known to occur regularly at Weija and offshore from Accra (Grimes 1972). Apparently rare or absent farther west.

Sterna caspia Three moving west off Dixcove on 10 Mar 1978.

S. sandvicensis Fairly common offshore and on saltpans in winter, some remaining in summer.

S. dougallii About ten at Shama on 23 Aug 1976; one moving west off Dixcove on 10 Mar 1978. Perhaps overlooked.

S. hirundo Small numbers offshore and on saltpans in winter, a few remaining in summer.

S. paradisea An immature bird on Amisa Lagoon on 14 Mar 1978, another at Elmina on 10 Apr 1978, and an adult off Elmina on 10 Apr 1978. Perhaps overlooked.

S. hybrida An adult at Weija on 11 Apr 1976, one at Cape Coast on 3 June 1977 with Black Terns.

S. leucoptera Six adults at Weija on 11 Apr 1976.

S. nigra Abundant on the coast in winter with fair numbers remaining throughout the summer.

Cuculus canorus ssp. One at New Debiso on 8 Apr 1977 (Taylor & Macdonald 1978). The race of this bird was not determined but it was probably *canorus*. In Ghana the African race *gularis* is strictly a savanna species and would be most unlikely to occur in the forest zone.

Clamator glandarius One at Cape Coast in mid-Jan 1976. The bird is not known to breed closer to Cape Coast than Accra and this was the only local record, but the possibility of it being a dispersing African bird cannot be excluded.

Caprimulgus europaeus A male at Cape Coast on 4 Jan 1976.

Apus apus A common winter visitor over the forest zone with passage only on the coastal strip. First dates: 8 Aug 1976 (but next not until 10 Oct), 9 Oct 1977; last dates: 2 May 1976, 20 May 1977, 11 May 1978. Passage on coast: 1 Apr to 2 May 1976, 17-20 May 1977, 28, 30 Apr, 9-11 May 1978; 7-13 Oct 1976. Several in Mole on 9 Apr 1976. Prospecting behaviour with *A. affinis* at Cape Coast May 1977, Apr and May 1978.

A. pallidus Two at Cape Coast on 30 Nov 1976, several at Tafo on 29 Jan 1978. Maybe overlooked among *A. apus* over forest, but certainly in the minority there.

Merops apiaster Some 30 near Legon on 13 Oct 1976.

Coracias garrulus One at Mole on 6 Apr 1976 (Taylor & Macdonald 1978).

Upupa epops One at Mole on 7 Apr 1976 (Taylor & Macdonald 1978).

Jynx torquilla One at Cape Coast on 6 Mar 1976.

Hirundo rustica An abundant winter visitor, especially in the forest zone, from Aug to Apr.

H. daurica One at Cape Coast on 7 Nov 1976. This may have been one of the West African breeding population which, however, does not breed locally.

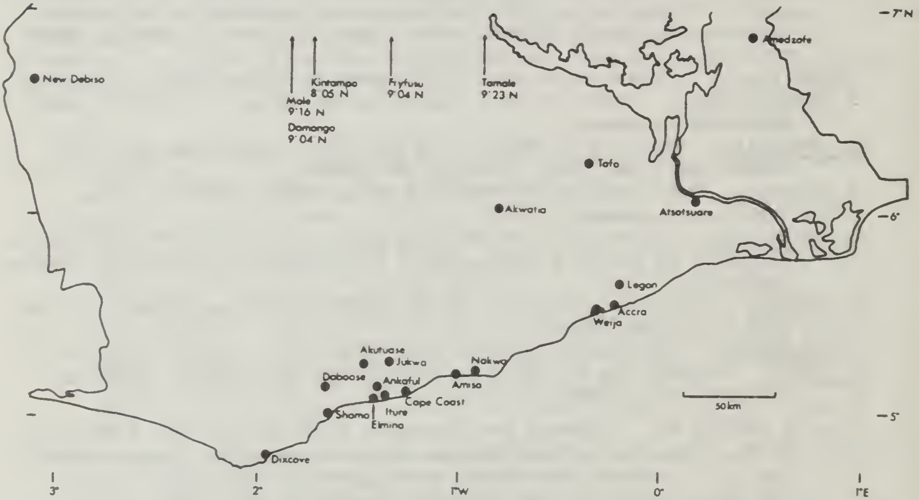

Figure 1 Map of southern Ghana showing localities mentioned in the text.

Delichon urbica Up to eight at Mole, 4-9 Apr 1976, one at New Debiso on 8 Apr 1977, and one at Mole on 8 Jan 1978.

Motacilla flava An abundant winter visitor in all habitats except closed forest from October to April. First dates: 13 Oct 1976, 17 Oct 1977; last dates: 1 May 1976, 1 May 1977, 7 May 1978 (but only two seen after 24 Apr). Males of races flavissima (one Weija 11 Apr 1976), cinereocapilla (one Cape Coast 24 Apr 1976), flava and thunbergi identified in the field. The last named was the commonest form judging from spring observations, with flava not uncommon. Ten of eleven spring flava identified were in March (the other on 18 Apr) while 26 of 28 thunbergi were recorded in the last three weeks of April (the others on 18 Feb and 19 Mar). This suggests an earlier moult or passage of the more southerly breeding flava than the most northerly thunbergi. A few individuals of both races were identified in autumn. All birds identified racially were males with fully moulted head plumage.

Anthus campestris One at Ankaful on 27 Feb 1977, one at Nakwa on 21 Jun 1977. These records are well to the south of the normal range of species, and the Jun one out of season. Despite that, the identification is beyond doubt.

A. trivialis Recorded at Mole on 9 Apr 1976 (one), 4-8 Jan 1978 (one to two). Also at Tafo on 13 Feb 1977 (one), 29 Jan 1978 (at least three). Apparently widespread but very local as not recorded from Cape Coast area.

A. cervinus Found regularly only on a small area of saltpans near Cape Coast. First dates: 28 Nov 1976, 31 Dec 1977; last dates: 31 Mar 1976, 30 Mar 1977. Two (probably migrating) at Mole on 5 Apr 1976 (Taylor & Macdonald 1978). Other localities: Nakwa and Ankaful, once each.

Lanius senator Two at Mole, 6-9 Apr 1976, one or two there 4-9 Jan 1978 (Jan birds all L. s. senator). One (still in juvenile plumage) at Nakwa on 13 Nov 1977 (probably L. s. badius). One at Cape Coast 20 Feb-20 Mar 1977 and 23 Jan-17 Feb 1978 (definitely both L. s. badius). This accords with Bannerman's (1953) statement that badius has a more southerly winter range than senator. The long stay of the two Cape Coast birds suggests a rather sedentary habit in the wintering area.

Saxicola rubetra A fairly common winter visitor to coastal areas. First dates: 13 Oct 1976, 30 Oct 1977; last dates: 8 Apr 1977, 9 Apr 1978. Recorded also at Mole, 4-9 Jan 1978, Tafo and New Debiso. Seasonal distribution of records was as follows (number of records per month):

	Oct	Nov	Dec	Jan	Feb	Mar	Apr
1976-77	1	1	4	5	5	8	1
1977-78	1	3	4	6	6	6	2

Luscinia megarhynchos Seven records fell between 14 Dec and 7 Apr, at Cape Coast, Accra Plains, Tafo and New Debiso. Because of its skulking habit it is probably much commoner than these records suggest.

Acrocephalus schoenobaenus At least two at Nakwa on 13 Jan and 11 Feb 1978; at least six at Tafo on 29 Jan 1978.

A. scirpaceus Several Tafo 11-12 Feb 1976.

A. arundinaceus Several Tafo 11-12 Feb 1976.

Hippolais polyglotta A fairly common visitor, more numerous on the Accra Plains. Recorded also at Cape Coast, Nakwa, Tafo, Mole. First dates: 28 Nov 1976, 10 Nov 1977; last dates: 2 Apr 1976, 30 Apr 1977, 12 Mar 1978.

Sylvia borin A common winter visitor to the Cape Coast area: also recorded at Nakwa. First dates: 28 Dec 1976, 11 Dec 1977; last dates: 10 Mar 1976, 14 Mar 1977, 11 Mar 1978 (but one possible at Akutuase on 15 Apr 1978).

Phylloscopus trochilus Ten records between 10 Nov and 19 Mar at Cape Coast, Nakwa and Accra. Scarce in Cape Coast area but perhaps commoner around Accra. Song heard Jan to Mar.

P. sibilatrix Seven records between 15 Jan and 20 Apr, all from forest clearings and cocoa farm at New Debiso, Jukwa area, Akwatia and Tafo. No song heard. Late dates suggest that it is mainly a passage bird.

Muscicapa striata In the Cape Coast area it appears to be mainly an autumn passage migrant. First dates: 17 Oct 1976, 14 Oct 1977; last dates: 27 Feb 1977, 19 Feb 1978. The seasonal distribution of observations (number of records per month) on the coast was as follows:

	Oct	Nov	Dec	Jan	Feb
1976-77	3	3	0	0	2
1977-78	3	3	1	0	1

Other records were from Tafo on 13 Feb 1977, 5-6 Nov 1977, 29 Jan 1978; and Mole on 5-6 Jan 1978. They suggest that the species may winter in inland areas, both forest clearings and savanna, but precise data from these areas are required (cf. Gass 1957).

Ficedula hypoleuca Found only at Mole on 4-9 Apr 1976 and 4-9 Jan 1978.

Acknowledgements

Several people shared in a number of the records listed here, notably Dr I. R. Taylor, G. Vanderstichelen, R. and M. Lockwood, E. J. Pilcher and A. J. M. Smith. I am grateful to R. and M. Lockwood for their hospitality at Tafo, and to the Department of Game and Wildlife for permission to visit Mole National Park, Bia National Park (New Debiso), and Shai Hills Game Production Reserve. Prof P. Jarvis kindly provided facilities at the University of Edinburgh where the paper was prepared.

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CO-OPERATIVE BREEDING IN THE CHESTNUT-BELLIED STARLING SPREO PULCHER

by Roger Wilkinson

Received 8 August 1978

From March to June 1978 I found a total of thirteen occupied nests of the Chestnut-bellied Starling Spreo pulcher in the grounds of Bayero University campus, Kano, northern Nigeria. Five of these nests were predated or deserted at the egg stage and one was predated when containing well-developed chicks. Of the seven remaining nests at least one was used for two successive broods, young starlings fledging on 15 April and 1 June.

This note is confined to observations made at four of these successful nests, observations at the other nests being too casual to ascertain the type of breeding behaviour. All four are likely to represent second broods or second breeding attempts.

The first nest in which co-operative breeding was noted was sited within the structure of an old nest of the Buffalo Weaver Bubalornis albirostris located high up a Parkia tree. It was discovered on 26 May and contained an undetermined number of chicks which fledged within five days. Detailed observations on this nest amounted to only 45 minutes. Twice I saw four adult starlings at the nest; on the first occasion three of the adults entered the nest with food and on the second all four adults fed the chicks. The adults took turns in feeding, a bird only flying to the nest and entering it to feed after the previous bird had departed. On another visit seven starlings were seen in the close vicinity of the nest; one of these perched on the top of a nearby building and acted as a sentinel giving alarm calls whenever I approached too near to the nest. This behaviour may have discouraged the other birds from flying to the nest, for on this occasion only two starlings were seen to feed the young.

The second nest was built in a thorn tree and observations totalling 400 minutes were made between 24 May and the fledging of the last chick on 1 June. This was the second brood in this nest, the first brood having left the nest on 15 April. The 'sentinel' behaviour reported above was also witnessed at this nest, one starling frequently perching at the very top of a Parkia tree. A minimum of four adults (two of which were marked with colour rings) co-operated in feeding the nestlings. In addition a juvenile, recognisable by the lack of metallic green on the breast and probably from the first brood in this nest, was noted to feed the young on four separate occasions.

The third nest was built high up in a Parkia tree and when discovered on 1 June contained four well-developed nestlings. I watched it over a single period of 62 minutes. A total of five adults was observed, and with their conspicuous behaviour and calling they succeeded in distracting my attention from the nest. Although several adults were seen to enter the nest to feed the chicks it proved impossible to determine how many individuals were involved.

A period of 40 minutes was spent observing the fourth nest which was located in a thorn tree and was inaccessible. On 2 June four adults, one acting as a sentinel, were seen near this nest. Two of them co-operated in driving off a Buffalo Weaver which landed on the nest tree, but co-operative feeding of the young was not ascertained. On one occasion a juvenile with food in its bill flew to the nest but following 'warning' calls by the sentinel it flew off without feeding the nestlings.

Co-operative breeding has previously been reported in the Superb Starling Spreo superbus (T. R. Huels in Grimes 1976) and Fischer's Starling Spreo fischeri (Miskell 1977) and should be sought in other members of this genus. Although Spreo pulcher is the only West African representative of its genus careful observations of other starlings may prove rewarding.

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WEIGHT CHANGES OF SOME SAVANNA FINCHES IN GHANA

by N. C. Davidson, P. W. Greig-Smith and P. Fisher

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Revised 20 April 1978

INTRODUCTION

That many birds inhabiting the seasonal West African savannas suffer seasonal and diurnal weight changes is well known (Ward 1965, Fry 1970, Jones & Ward 1976, Davidson 1978). One of us has documented weight changes in two species of bishops (*Euplectes*) at Mole National Park, Ghana, in the Northern Guinea savanna zone (Davidson 1978), and this paper presents comparable data for several species of estrildine and fringillid finches: *Estrilda bengala*, *E. caerulescens*, *E. larvata*, *E. melpoda*, *Lagonosticta rara*, *L. rufopicta*, *L. senegala*, *Lonchura cucullata*, and *Serinus mozambicus*. *L. senegala* (Jones & Ward 1977) and *S. mozambicus* (Ward & Jones 1977) are known to make an early-rains migration, and some individuals may have been on passage during my study period.

These species were mist-netted in several habitats around Samole (09°16'N,01°51'W), Mole National Park, during the mid wet season (July/August) in 1974, 1975 and 1977, and the late wet season (September/October) in 1975. Most individuals were captured from large mixed flocks of finches feeding on abundant weed and grass seeds in disturbed vegetation around human habitation. Average weights of birds netted at Mole are given by Fry (1970) and Greig-Smith & Davidson (1977a), and weight changes of individuals by Greig-Smith & Davidson (1977b).

DAILY CHANGES

For analysis, weights have been grouped into two-hour periods. Although all the species fed together on the same food source, their weight changes showed no common pattern. Both sexes of *E. bengala* (Fig. 1), *L. rufopicta* (Fig. 2), *L. rara* (Fig. 2), and both sexes of *S. mozambicus* (Fig. 3) showed a significant increase of weight in late afternoon. *E. bengala* and *L. rufopicta* also had a significant peak in late morning. But *E. melpoda* (Fig. 1), *L. senegala* (Fig. 2) and *L. cucullata* (Fig. 3) had significant maximum weights in early or mid afternoon. Woodall (1975) noted a similar pattern in *L. cucullata*.

Davidson (1978) found that shortly before they breed, both sexes of *Euplectes afer* and *E. orix* show peaks of weight in the morning, but in the afternoon only males do - perhaps because females are laying down protein reserves (e.g. Jones & Ward 1976). The sexes of E. bengala and S. mozambicus (which were breeding - Greig-Smith 1977) showed similar patterns, consistent with feeding in the morning and late afternoon and avoiding activity in the heat of midday, (Davidson 1978). Ward (1965, 1969) considered a late afternoon weight increase to be normal for small birds, as a night-time energy

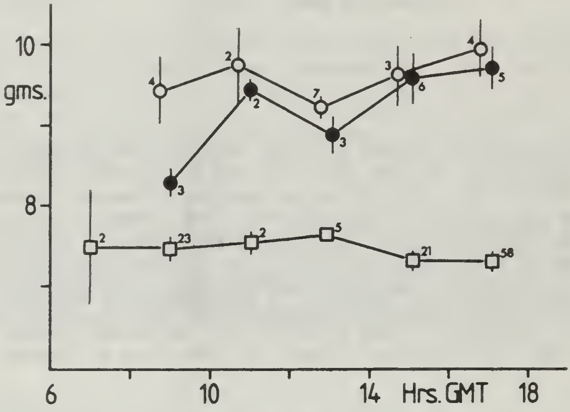

Figure 1 Daytime weight variation in Estrilda bengala ♂ ●, E. bengala ♀ ○, and E. melpoda □. Each point shows the mean ± 1 standard error. Numerals denote sample sizes.

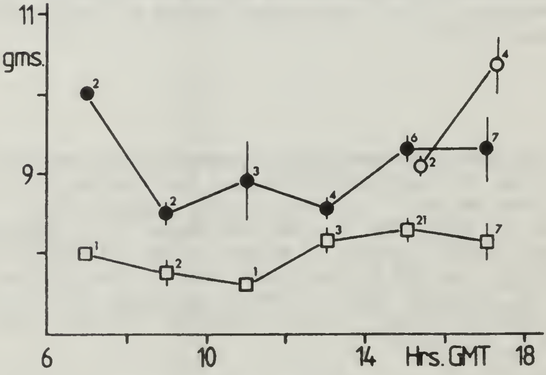

Figure 2 Daytime weight variation in Lagonosticta rufopicta ●, L. senegala □, and L. rara ○. Each point shows the mean ± 1 standard error. Numerals denote sample sizes.

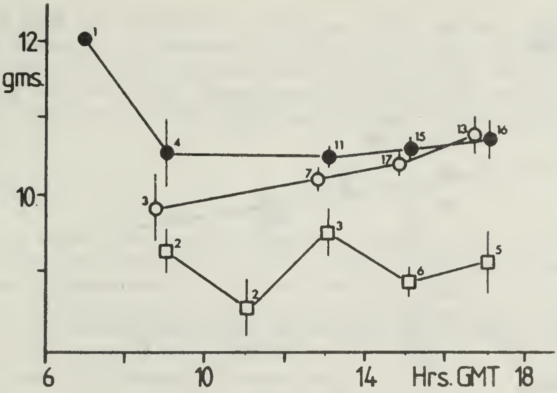

Figure 3 Daytime weight variation in Serinus mozambicus ♂ ● . S. mozambicus ♀ ○ , and Lonchura cucullata □ . Each point shows the mean ± 1 standard error. Numerals denote sample sizes.

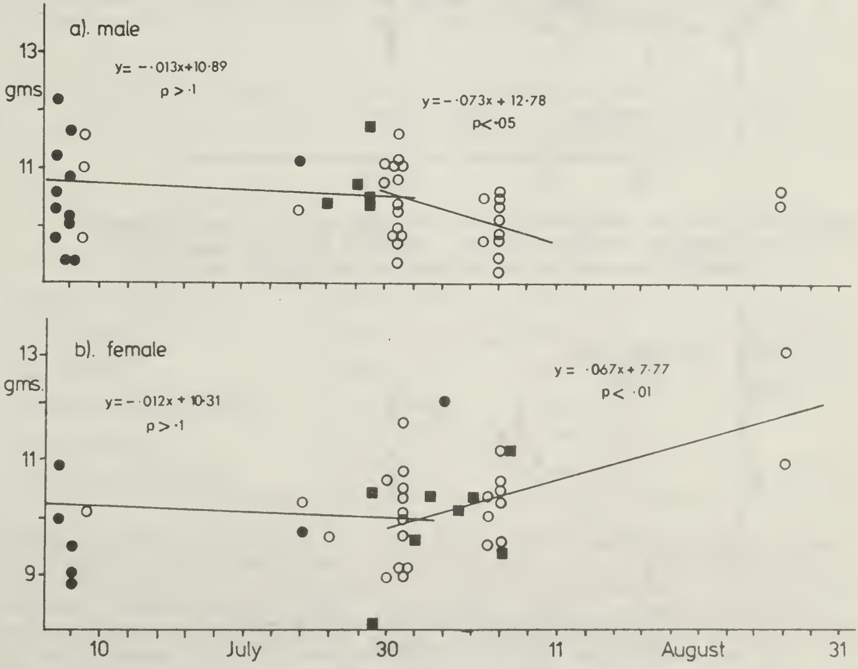

Figure 4 Seasonal weight changes in a) male and b) female Serinus mozambicus in 1974 ● , 1975 ○ , and 1977 □ . Weights are adjusted for daytime variation (see text). Regressions are for 1975 only.

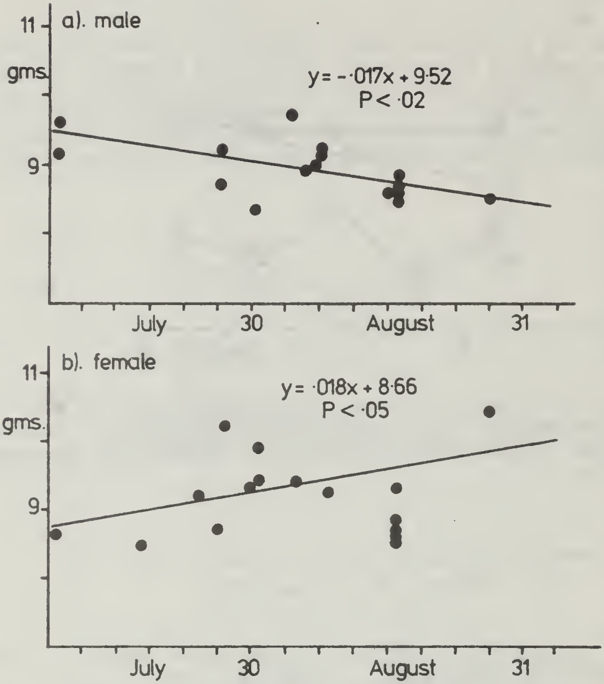

Figure 5 Seasonal weight changes in a) male and b) female *Estrilda bengala*. Data from 1974, 1975 and 1977 are combined, and weights are adjusted for daytime variation (see text).

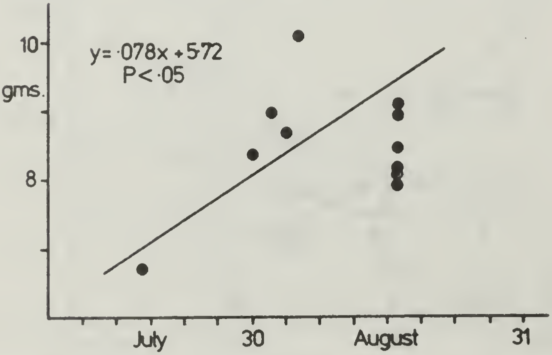

Figure 6 Seasonal weight change in *Estrilda caerulescens*. Data from 1974, 1975 and 1977 are combined, and weights are adjusted for daytime variation (see text).

reserve. A peak in the middle of the day might reflect either the formation of protein reserves (in females) as above, or a need to feed at that time. That could arise if nestlings are fed in the morning and evening, to the exclusion of self-feeding. At least two of the three species with an afternoon weight peak were breeding in the wet season (Greig-Smith 1977).

SEASONAL CHANGES

Morel & Morel (1970) noted that estrildines start breeding at a fixed time each year, but that other finches vary their time of breeding according to the rains. Consequently, we have combined weights of estrildines for all years, but those of S. mozambicus have been analysed with the years distinguished. To eliminate variations due to daytime changes, weights have been standardised to their midday level (1200-1400 GMT) by the addition or subtraction of mean percentage differences.

Table 1 shows changes between the mid and late wet season, revealing significant decreases of 4% and 7% in E. bengala females and E. larvata, and a significant increase of 9% in L. cucullata. Within the mid wet season, however, E. bengala females gained weight while males lost weight (Fig. 5). A comparable difference between the sexes of S. mozambicus was evident in July and August 1975, while the limited data from 1974 and 1977 appear to conform to the pattern (Fig. 4). Davidson (1978) found that E. afer males lose weight at that time of year, after maintaining a stable weight during July. This pattern is attributable to the northward movement of birds after and early rains migration (Jones & Ward 1977), and S. mozambicus makes a similar migration (Ward & Jones 1977). E. caerulescens gained weight in July and early August (Fig. 6), but no seasonal changes were detectable in E. melpoda, E. larvata, L. senegala, L. rufopicta, L. rara or Lonchura cucullata, beyond those shown in Table 1.

Table 1 Weights of estrildine finches at Mole National Park. Values are means (gms) ± 1 standard error, with sample sizes in parenthesis.

Species	Mid wet season	Late wet season	Significance (Student's t-test)
Estrilda bengala ♂	9.26±0.20(16)	9.26±0.14(3)	
E. bengala ♀	9.56±0.17(16)	9.13±0.13(4)	$P < 0.05$
E. larvata	9.63±0.26(7)	8.93±0.35(3)	$P < 0.05$
Lagonosticta rufopicta	8.97±0.35(10)	8.78±0.35(4)	
L. senegala ♂	7.92±0.23(5)	7.60±0.20(2)	
Lonchura cucullata	8.65±0.23(4)	9.50±0.36(4)	$P < 0.05$

Seasonal changes in these species are likely to have three causes: gonad hypertrophy before breeding, and recrudescence after breeding (e.g. Fry 1970); energetic costs associated with breeding (e.g. Ward 1965); and changes in feeding conditions, such as an increase in the abundance of grass seed towards the end of the wet season (e.g. Hopkins 1974). Interpretations of the patterns described above in terms of these factors requires breeding-time information, which is unfortunately lacking, although the available evidence (Greig-Smith 1977) suggests that differences among breeding birds are as great as those between breeding and non-breeding species.

ACKNOWLEDGEMENTS

We are grateful to the Ghana Game and Wildlife Department for providing facilities at Mole National Park, and to the many people who assisted with netting. Finance was provided by grants to the 1st, 2nd, and 4th Aberdeen University Ghana Expeditions from the Royal Society, the Carnegie Trust, and Aberdeen University.

SUMMARY

Daily and seasonal weights of estrildine and fringillid finches were studied in Mole National Park during the 1974, 1975 and 1977 wet seasons. There are no common patterns of weight change, nor are there consistent differences between breeding and non-breeding species.

RÉSUMÉ

Au cours des saisons humides de 1975 et 76, les variations journalières et saisonnières du poids ont été étudiées chez les Estreldidés et les Fringillidés du Parc National du Mole. Les resultats indiquent qu'il n'y a ni schème commun de modification du poids, ni différences significatives entre les espèces reproductrices et non reproductrices.

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Bull. Nigerian
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FURTHER EVIDENCE FOR MIGRATION OF BIRDS OF NORTHERN GUINEA SAVANNA

by M. A. Macdonald

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The evidence for seasonal movements in birds of northern Guinea savanna at Mole National Park, Ghana (09°16'N, 01°51'W) has been compiled by Greig-Smith (1977) and supplemented by Taylor & Macdonald (1978). This note adds comments on the phenomenon, based on general comparisons between my two visits to the Park in April 1976 (end of the dry season) and 3-10 January 1978 (middle of the dry season). In each visit the duration and the effort expended in the field were comparable. This paper should be read in conjunction with Taylor & Macdonald (1978); communication problems prevented the two papers being published together.

The evidence for movements in the following species supplements Greig-Smith's conclusions (1977):

GREY-BREASTED HELMET GUINEA-FOWL Numida meleagris In April 1976 it was abundant in both orchard bush and riverine forest. In January 1978 only one flock was seen in orchard bush, but it was abundant in riverine forest at Lovi. Either the wet-season influx described by Greig-Smith begins before the end of the dry season, or major inter-habitat movements are involved.

BROWN-NECKED PARROT Poicephalus robustus Regular in April, not recorded in January. The apparent seasonality in this and the next species (both frugivores) may be due to local movements.

SENEGAL LONG-TAILED PARAKEET Psittacula krameri Regular in small numbers in April, very common in January.

RUFOUS-CROWNED ROLLER Coracias naevia Not recorded in April, singles regular in January.

BLUE-BELLIED ROLLER C. cyanogaster Regular in April; not recorded in January although one was seen near Techiman (07°39'N) on 10 Jan. Described as migrants by Greig-Smith, these observations suggest that the seasons of Blue-bellied and Rufous-crowned Rollers at Mole are wholly or partly separate. The Abyssinian Roller C. abyssinica was common on both visits.

BROAD-BILLED ROLLER Eurystomus glaucurus Common in April, small numbers in January. Described by Greig-Smith as wholly migrant, present only in the wet season. This is evidently not always so.

BEARDED BARBET Lybius dubius Common in April, only two recorded in January. Described by Greig-Smith as resident, and not listed as migratory by Elgood et al. (1973). Frugivorous, so local movements may be involved.

LONG-TAILED SHRIKE Corvinella corvina Common in April but distinctly scarce in January. Described by Greig-Smith as resident, by Moreau (1966) as migrant, while Elgood et al. (1973) found no evidence for migration.

RED-SHOULDERED CUCKOO-SHRIKE Campephaga phoenicea Common in April but scarce in January, which suggests that the wet-season influx described by Greig-Smith in fact occurs before the end of the dry season.

PARADISE FLYCATCHER Terpsiphone viridis Common in April, only two (together) seen in January. I conclude the same as for C. phoenicea.

SPARROW WEAVER Plocepasser superciliosus Scarce in April, abundant in January. Not previously suggested to migrate.

We have suggested that dry-season emigration occurred in several other species (Taylor & Macdonald 1978), of which the following corroborations were made in January 1978. Suggestions of a general dry-season emigration were supported for Spur-winged Goose Plectropterus gambensis (none seen), Mourning Dove Streptopelia decipiens (one only), Pygmy Kingfisher Ceyx picta (one only), Senegal Wood-hoopoe Phoeniculus purpureus (two groups), Lesser Wood-hoopoe P. aterrimus (none), Brubru Nilaus afer (one only), Snowy-crowned Robin-chat Cossypha niveicapilla (one, greatly outnumbered by C. albicapilla), West African Penduline Tit Remiz parvulus (one group) and Senegal Fire-finch Lagonosticta senegala (none).

A late dry-season emigration was suggested by January observations of the following species which were rare or unrecorded in April: Stone Partridge Ptilopachus petrosus (regular), Red-billed Wood Dove Turtur afer (regular in riverine forest), Greater Honey-guide Indicator indicator (two seen), Long-crested Helmet-Shrike Prionops plumata (three groups), Pale Flycatcher Bradornis pallidus (common) and Little Bunting Emberiza forbesi (two separate pairs).

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I am grateful to the Ghana Department of Game and Wildlife for permission to work in the Park.

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BIRDS OF YANKARI GAME RESERVE, NIGERIA

by Chris Geerling

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Revised 21 April 1978

About the same time as Dyer & Gartshore (1975) published their annotated list of the birds of Yankari Game Reserve I published a comprehensive list elsewhere (Geerling 1976). In addition to the periods spent in Yankari, as mentioned in that paper, I visited the Reserve again with the students and staff of the Garoua College of Wildlife Management from 17 to 26 January 1976 and from 13 to 21 April 1977. During those visits I and my colleagues Bart van Lavieren, Georges Macon and Emile Ottong compiled a list of the species we recorded, of which the following are additional to those of Dyer & Gartshore (1975 and 1976).

Ixobrychus minutus Two observations in *Cyperus* swamps (Aug, Nov).
Ixobrychus sturmii A number of observations in open situations along the Gaji during the dry season.
Egretta ardesiaca Two observations in the Gaji valley (Jan, Apr).

Circaetus cinereus Frequent observations both along the Gaji and away from it.
Circaetus cinerascens One among tall trees along the Gaji in Jan.
Accipiter erythropus One observation when on foot along the Gaji in Feb.
Accipiter ovampensis One observation in undergrowth along the Gaji (Nov).
Accipiter melanoleucus During the 1971 dry season a pair were around Wikki Camp; also seen elsewhere, mainly away from the Gaji.
Elanus caerulus Two seen in the Gaji valley (Nov, Dec).
Falco cuvieri One among tall trees near the Gaji in Mar.
Falco vespertinus One observation in the Gaji valley in Jan.

Porphyrio alleni Record by Dr Janet Noel.

Vanellus lugubris One observation in Jan.
Gallinago gallinago A bird flushed near the Gaji in Feb.
Rostratula benghalensis In some numbers early Mar, apparently migrating.

Cursorius chalcopterus A few birds in freshly burned ground in Nov.

Streptopelia turtur One observation in the Gaji valley in Feb.
Streptopelia decipiens Some along the Gaji in Jan.

Turacus persa One seen along the Gaji in Jan.

Chrysococcyx klaas One in the Wikki Spring forest in Mar.
Chrysococcyx caprius One observation in the Wikki Spring forest in Mar.

Otis leucotis Observations in Jan; probably fairly common along the Gaji.
Bubo africanus Found dead on the main road, common in the Reserve.

Chaetura sabini One bird over the Gaji in Nov.

Merops albicollis Only seen in Nov, but then in some numbers, apparently moving through.

Indicator minor Record by Dr Janet Noel.

Mirafra nigricans Several observations in savanna in Feb and Mar.

Hirundo senegalensis Record by Dr Janet Noel.

Motacilla alba One bird in Wikki Camp in Nov.

Tchagra minuta In Nov along the Gaji.
Laniarius ferrugineus Recorded by Dr J. Lang as common.

Cercomela familiaris Record by Dr J. Lang in Mar.
Cossypha niveicapilla Not uncommon along the Gaji.
Myrmecocichla cinnamomeiventris Recorded by Dr J. Lang.
Phoenicurus phoenicurus One observation in Jan.
Acrocephalus rufescens Caught in Cyperus swamps; probably not uncommon.
Hyliota flavigaster Several observation in woodland along the Gaji.
Bradornis pallidus Observations in Mar and Apr, mostly in the Wikki Spring forest.
Trochocercus nitens In dense swamp forest at Tunga Maliki in Mar.

Nectarinia venusta Recorded by Dr J. Lang in Feb and Mar.

Serinus leucopygius Recorded by Dr J. Noel in Jul.

Euplectes afer Several males in the flooded parts of the Gaji valley in Jul and Aug.
Nesocharis capistrata Recorded by Dr J. Lang in Mar.
Lonchura malabarica First observed in Apr 1977: a sure sign, together with the increase in numbers of Passer griseus, of the urbanisation of Wikki Camp.

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WEIGHTS OF GHANAIAN BIRDS AND DISTRIBUTION DATA FOR TWO SPECIES

by L. G. Grimes

Received 11 September 1978

While living in Ghana I collected the following weight data (in gm, accurate to 0.1 gm) using a conventional laboratory balance; they supplement data already published on Ghanaian birds (Harvey & Harrison 1970, Karr 1976, Greig-Smith & Davidson 1977). Unless otherwise stated, the birds were collected within the campus of the University of Ghana, Legon (5.63°N, 0.19°W), and in most cases were sexed by dissection. Those not sexed are also listed. The average rainfall data for Legon show a major peak in rainfall between May and July and a minor one in September and October, with little or no rainfall in the remaining months. The nomenclature and sequence follow that of Mackworth-Praed & Grant.

Centropus senegalensis ♂ 159.4 (4 Dec)
Aerops albicollis 22.3 (10 Nov), 22.1 (11 Nov), 20.6 (8 Dec), 20.5 (10 Dec)
*Indicator indicator ♀ 44.1 (31 Dec)
*Turdoides plebejus ♂ 63.2 (8 Apr)
*T. reinwardii ♂ 82.5 (26 Nov); ♀♀ 69.1, 73.3, 76.5 (all on 26 Nov); 75.5, 75.7 (both on 1 Jan)
*Pycnonotus barbatus 37.6 (8 Dec)
*Pyrrhurus simplex ♂ 50.0 (28 Nov); ♀♀ 42.5, 43.1 (both on 11 Dec); 42.7 (30 Dec)
*Eurillas virens ♀ 25.2 (?)
*Platysteira cyanea ♀ 12.7 (30 Dec); Imm. 11.5 (30 Dec)
Tchitrea rufiventer 14.5 (4 Jan)
*Turdus olivaceus ♀ 60.1 (30 Dec); 65.8 (7 Dec), 60.7 (8 Dec), 58.7 (10 Dec), 57.9 (31 Dec), 59.8 (?)
Luscinia megarhynchos 22.2 (5 Dec)
Sylvia borin 15.5, 19.6 (both on 12 Dec)
Acrocephalus scirpaceus 10.0 (12 Dec)
A. schoenobaenus 9.8, 10.2 (both on 30 Jan), 10.5 (?); all three were netted in Typha australis on the edge of a reservoir close to the Tema motorway.
Calamocichla rufescens ♂ 23.2 (5 Jan); 17.9, 19.6 (both on 30 Jan). The male was shot in Mangrove swamp along the Densu river west of Accra, the others were netted in the same Typha bed as the previous species.
*Sylvietta virens 7.9 (10 Dec)
*Prinia subflava 9.4 (8 Nov)
*Corvinella corvina ♂♂ 68.2 (14 May), 60.0 (24 May), 79.9 (23 Mar), 58.0 (5 Aug), 60.0 (20 Sep), 63.0 (? Sep), 60.4 (3 Dec), 68.8 (6 Nov); ♀♀ 70.4 (5 Nov), 62.1 (6 Nov), 68.5 (26 Nov)

**Laniarius barbarus* ♀ 44.9 (7 Nov); 48.1 (26 Nov)
**Dryoscopus gambensis* 36.4 (?)
**Chlorophoneus sulfureopectus* ♂ 29.8 (?); 25.5 (10 Dec)
Lamprocolius chalybaeus 83.0 (15 Dec)
L. chalcurus ♀ 80.5 (18 Jan)
L. purpureus 98.2 (11 May)
**Ploceus nigricollis* 23.7 (11 Dec)

My data for those species asterisked, that have been collected by other workers in Ghana are, in general, within the range of their values. The only notable difference is my weight for *Indicator indicator* which is approximately 20% less than that listed by Greig-Smith & Davidson (1977). The difference may well be real and not an error as their data were collected in the wet season and mine in the dry.

The *A. scirpaceus* specimen was netted in dense thicket within the Botanical gardens of the University; another was netted in the same *Typha* bed and during the same netting period as the *A. schoenobaenus* and *Calamocichla rufescens* specimens. The mention in Mackworth-Praed & Grant that *C. rufescens* probably occurs in Ghana presumably rests on the probable sighting of the bird by members of the Oxford University team that visited the Molė Game Reserve in the north of Ghana in the wet season of 1968 (Harvey & Harrison 1970). Serle & Morel used the present data in listing Ghana as part of its range but it is noteworthy that it has not been located, although looked for, in coastal areas west of the Accra Plains. All three skins are now in the University Museum of Zoology, Cambridge. They have been compared by C. W. Benson with 26 from Nigeria and Cameroun in the British Museum (Natural History), of which only three (one from Nigeria and two from Cameroun) have the same markedly tawny wash, especially on the rump and flanks. All six appear to be immature.

The Blue-eared Glossy Starling *L. chalybaeus* was shot while it was feeding with other glossy starlings on flying termites. The skin was sent to C. W. Benson and he has kindly compared it with other skins and confirmed the identification. This skin extends the southern limit of *L. chalybaeus*, quoted in Serle & Morel (1977) as 12°N, to the coastal areas of eastern Ghana.

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MARBLED DUCK AND EUROPEAN MOORHEN IN NIGERIA : NEW BIRDS FOR WEST AFRICA - The winter of 1977-1978 was the best that I have known in some twenty years for Palaearctic duck in northern Nigeria. The reason appears to lie in the pattern of rainfall. Over the years from 1952 to 1971 the five-year running average of annual rainfall never fell below 81 cm. The five-year average from 1973 to 1977 inclusive was 66.62 cm, while in 1977 73.33 cm of rain fell; however, a large part of the 1977 rainfall was in two weeks in August, producing larger floods than usual. The new Tiga Dam, south of Kano, spilled for the first time that month, and the water authority has been releasing water daily since then. It has produced a rising water table in the Hadejia Valley, at a time when the area is usually drying out. Farmers who earlier in the year were complaining about the lack of water, found that they could neither harvest their cotton nor sow for the coming dry season.

In the Nguru area (12°53'N, 10°28'E) there was much more flooding than usual, and the greatest counts of Pintail Anas acuta and Garganey A. querquedula were 1500 birds each. Our well-informed hunter-guide in Nguru, Mallam Yakuba, produced the corpse of a Marbled Duck A. angustirostris that he had shot near Nguru out of a party which, he said, numbered about 50. Mallam Yakuba knows all the Palaearctic duck species that winter in northern Nigeria well, and he said that he had never previously seen that duck. Its wing measured 101 mm. It constitutes the first record for Nigeria and West Africa.

The heavy rain in August 1977 also flooded a marsh on the Karkarna road to the north of Kazaure (12°40'N, 08°25'E) to a greater extent than local people could recall before. The peak duck count was on 29 January, when approximately 5000 Pintail, 5000 Garganey and 100 Shoveler A. clypeata were seen. Local fishermen caught a number of birds on their fishing lines, mainly Night Herons Nycticorax nycticorax, Black-winged Stilt Himantopus himantopus and Moorhens Gallinula sp.; they also caught Hottentot Teal A. hottentota and Purple Gallinule Porphyrio porphyrio, which I had not seen in that area for many years. The Moorhens seemed to be on the large side, and two wings were sent to the British Museum (Natural History), London, where they were identified as European Moorhens G. chloropus chloropus, the first recorded in Nigeria or West Africa. In addition a flock of Coot was present on the marsh, numbering nearly 500 in December; one caught by fishermen was definitely the Palaearctic Fulica atra, not the African Red-knobbed Coot F. cristata. Black-headed Gulls Larus ridibundus were present in numbers up to the end of January 1978, the largest count being 45, with a few Grey-headed Gulls L. cirrhocephalus. Very many White-winged Black Terns Chlidonias leucoptera were present throughout the dry season - too numerous to count but certainly running into several thousands. One Garganey was brought to me bearing a Latvian ring, and I ringed a further 60 of them. A deep lake nearby had a small flock of eight Tufted Duck Aythya fuligula and 28 Pochard A. ferina.

The flooded Kano river between Hadejia and Nguru produced the largest concentrations of duck seen in the winter. On 26 February an estimated 17750 birds were counted. This included 11000 Garganey, 2000 Pintail, 200 Ferruginous Duck Aythya nyroca, and many local duck. This area has been proposed as a wildfowl Reserve with controlled shooting during the season.

R. E. Sharland

BEHAVIOUR OF GREY-HEADED BUSH-SHRIKES AT THEIR NEST - On 4 June 1978 a nest of the Grey-headed Bush-Shrike Malaconotus blanchoti was found in a well-established garden in Bayero University campus, Kano, Nigeria. It was a rather untidy platform-like structure of black twigs, built at a height of about 5 metres in the fork of a Cassia tree. Intermittent observations totalling over 5 hours were made until the last of a brood of three young fledged on 6 July.

Normally the adults would arrive independently at the nest site, but often one would not approach the nest to feed until a second arrived. Before flying to the nest with food an adult would often adopt a horizontal posture and holding its wings slightly away from the body would quiver them rapidly. That was observed in two other contexts. When two adults were present in the vicinity of the nest one quivered its wings before approaching the other. The third context in which wing quivering was observed may relate to the derivation of this behaviour. Up until the time of fledging an adult would brood the young not only at night but also in the early afternoons, presumably to shade the chicks from the overhead sun. When a second adult arrived with food, this was always given first to the brooding adult which then passed it to one of the chicks. The brooding adult was once seen to quiver its wings rapidly before accepting the food and this behaviour closely resembled that of older nestlings when begging for food.

An adult would seldom approach the nest directly but would spend periods of up to several minutes banging its prey against a branch and manipulating it in the beak before finally wing quivering and flying to the nest. That was particularly the case with large items like mantids and with a lizard which was broken into pieces before being fed to the young.

Twice I saw three adult shrikes in the vicinity of the nest. When the nest was first discovered one adult, presumably incubating eggs, left it and uttering loud "ptut!, ptut!" calls flew into an adjacent tree where it was conspicuously joined by two others. Then on the afternoon of 30 June I saw two adults actively pursuing a Pied Crow Corvus albus whilst a third brooded the chicks. Although these observations suggest that adults other than the parents may be involved in nest defence, on no occasion were more than two shrikes observed feeding the young. This alone cannot serve to exclude the possibility of co-operative feeding of nestlings,but emphasises the desirability of studies on individually marked birds.

Roger Wilkinson

ADDITIONS TO LOCAL AVIFAUNAS

MOLE GAME RESERVE, GHANA. Further to the list of birds compiled by Greig-Smith (1976, Bull. Nigerian Orn. Soc. 12: 49-66) are:

Lesser Blue-eared Glossy Starling Lamprotornis chloropterus Two seen daily in January 1978 on the motel scarp.

Warbling Silverbill Lonchura malabarica Five and three seen separately on 4 January and three seen on 6 January 1978. This is another species more typically associated with Sudan and Sahel savannas (Hall & Moreau 1970, An Atlas of Speciation in African Passerine Birds, London) which has turned up at Mole for the first time in the dry season, increasing the evidence for a southward tendency in arid-zone birds after the rains (Macdonald 1978, Bull. Nigerian Orn. Soc. 14: 80-81).

M. A. Macdonald

BIA NATIONAL PARK, GHANA. Further to Taylor & Macdonald's list of species recorded from Bia National Park, Ghana (1978, Bull. Nigerian Orn. Soc. 14: 36-41), during a brief visit to the same area of the Park from 17 to 19 August 1975 I recorded the following three species not included in their list:

Narina Trogon Apaloderma narina One seen in primary forest.

Forest Wood-Hoopoe Phoeniculus castaneiceps One seen in a mixed-species feeding flock in secondary growth canopy.

Red-sided Broadbill Smithornis rufolateralis One seen in primary forest understory.

N. C. Davidson

YANKARI GAME RESERVE, NIGERIA. I visited Yankari Game Reserve on 7 May 1978, and in a kurmi by the principal Hippo pool I clearly heard an Emerald Cuckoo Chrysococcyx cupreus. That is a new record for the Reserve

R. E. Sharland

ON THE FIELD IDENTIFICATION OF THE YELLOW-BILLED EGRET

Sir,

When discussing the problem of distinguishing the Yellow-billed Egret Egretta intermedia from the Great White Egret (Heron) E. alba in the field, Macdonald (1976, Bull. Nigerian Orn. Soc. 12: 73) did not mention the following point of distinction. In the Yellow-billed Egret the black line of the gape ends immediately below the eye whereas in the Great White Egret it extends over 1 cm past the eye (Cramp & Simmons, 1977, The birds of the Western Palearctic, Vol. I, O.U.P., Oxford, p. 296; Stronach, 1968, Ibis 110: 345; see also Broekhuysen 1969, Field guide to the birds of the South African sea-shore, Timmins, Cape Town, pp. 46-47). At close range the absence of a black line beyond the eye is a good field character of the Yellow-billed Egret.

Adult Yellow-billed Egrets in breeding plumage can also be told from Great White Egrets by the shorter scapular plumes ('aigrettes'). In the Yellow-billed Egret the scapular plumes reach a little, in the Great White Egret far, beyond the tip of the tail (Cramp & Simmons 1977: 296, 301). Under certain conditions (for instance, when observing a flying bird), this can be a useful additional point of distinction.

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MIGRATION OF SAVANNA BIRDS REVEALED BY LOCAL RECORDS

Sir,

By a synthesis of information from localities throughout Nigeria, Elgood, Fry & Dowsett (1973, Ibis 115 : 1-45 and 375-411) revealed a tendency for many bird species to migrate northward for the wet season and southward for the dry season. The latitudinal uniformity of climate and vegetation zones over much of West Africa suggests that their conclusions apply more widely. Several authors (e.g. Pettet 1976, Bull. Nig. Orn. Soc. 41 : 18-24; Greig-Smith 1977, Bull. Nig. Orn. Soc. 43 : 3-14; Hall 1977, Bull. Nig. Orn. Soc. 43 : 15-36; Gee & Heigham 1977, Bull. Nig. Orn. Soc. 44 : 103-132; Taylor & Macdonald 1978, Bull. Nig. Orn. Soc. 45 : 4-8) have recently commented further on the migration of particular species, based on records suggesting seasonal absence or rarity at single localities. Here I discuss whether such records are adequate to demonstrate migratory behaviour, or to identify its nature. The question has been prompted by recent studies in the Guinea savanna zone, but the arguments apply in principle to the birds of other zones.

Impressions of a species' seasonal migration from a site must rely on changes in its observed abundance, detected by censusing (e.g. Greig-Smith 1977), mist-netting (e.g. Fry 1970, Ostrich suppl. 8 : 239-263) or casual observation. Such evidence is greatly strengthened if changes are replicated in several years. However, observed changes could be due to any one of the following factors: (i) mortality; (ii) recruitment of young; (iii) changes in occupancy of different habitats; (iv) changes in conspicuousness within a habitat, reflecting the birds' habits (e.g. cessation of territorial displays outside the breeding season), adoption of eclipse plumage, or the growth and destruction of vegetation cover; (v) immigration and emigration from the area. All of these influences are likely to be seasonally biased, probably differ between species, and their importance may be difficult to estimate without detailed study of the species concerned. In addition, errors may arise through variation in the efficiency or ability of different observers (see Greig-Smith 1977), although in principle this variable can be readily controlled.

These considerations mean that observers may be misled into interpreting a seasonal change in numbers of birds recorded as due to migration rather than other causes, or vice versa. Without direct investigation of the factors listed above, decisions on this question rely largely on the personal opinions of the authors, and are unsatisfactory scientific evidence. Thus many of the discrepancies between my own conclusions (Greig-Smith 1977) and those of Taylor & Macdonald (1978) at the same site are impossible to resolve objectively from the information available.

A further complication is introduced when migration is inferred by taking records from different years as representative of different seasons. There are large year-to-year fluctuations in climate in the savanna zones (e.g. Morel & Morel in press, Mem. O.R.S.T.O.M.; Greig-Smith in press, Report of 4th Aberdeen Univ. Ghana Exp.), partly responsible for changes in local status. For example, there were obvious differences in the abundance of many species at Mole National Park, Ghana, between the early wet seasons of 1974, 1975 and 1976 (unpubl. data of P. W. Greig-Smith, N. C. Davidson, and A. H. Cuthbert), while even greater yearly changes occur in the sahel zone (Morel & Morel in press). Therefore, conclusions regarding migratory status based solely on visits as much as seven years apart (Taylor & Macdonald 1978) are of doubtful validity.

Thus it is difficult to recognise seasonal immigration or emigration from changes in numbers alone, particularly if the species is never entirely absent. However, let us assume that for some species this can be reliably accomplished. It is then possible to envisage a continuum of 'migratory' behaviour, which can be summarised by the following stages: (a) birds retain the same territory or home range throughout the year (i.e. they are fully resident); (b) birds become more restricted in their ranging at some seasons than at others, though always retaining some part of their range; (c) birds make a seasonal change in habitat preference, becoming confined to a different habitat at the same locality; (d) birds' ranges in different seasons are entirely discontinuous.

Only the last category is usually thought of as 'migration', (b) and (c) generally being classed as 'local movements'. However, the 'migration' category covers a wide range of behaviour. In some species, all birds might make similar movements in a consistent direction, often following a traditional route (as in many of the patterns revealed by Elgood et al. 1973), whereas in others movements might be uncoordinated, in a variety of directions (such as probably occurs in many waterbirds as aquatic habitats shrink in the dry season). All members of a population might migrate, or only some individuals (e.g. certain age-classes, or birds in sub-optimal habitats). The behaviour of individuals might vary yearly between residence and migration (e.g. in response to fluctuations in rainfall). Synchrony of movements within populations might vary; while the timing, distances, and relationship of moult and breeding to migration differ between species (see Elgood et al. 1973). Clearly, a simple distinction between 'residents' and 'migrants' is a poor reflection of this diversity, while the assumption implicit in some accounts, that species have migration patterns characteristic of all their populations in all years, is probably unjustified.

Do these objections mean that local records are valueless? The answer is clearly no, since the important analysis by Elgood, Fry and Dowsett (1973) was based on such information. Records from a single site, though often inevitably short-term and non-quantitative, can readily add information by noting times of arrival and departure, and whether absences are partial or total. Where regular censusing is feasible, further information can be obtained with little additional effort. For example, noting the positions of sightings along a regular transect route allows assessment of the pattern of dispersion of a population, and its seasonal changes. Levels of conspicuousness are measurable by methods such as Emlen's (1971, Auk 88 : 323-342), involving the calculation of objective 'coefficients of detectability', applied to savanna woodland birds by Greig-Smith (1978, Ibis 120 : 284-297, and in press). Changes in ranging and habitat preferences at a locality can be identified by marking individual birds (Greig-Smith in press), or less satisfactorily by correlating the results of censuses in different habitats, - thus a decrease of a species in savanna woodland at the same time as an increase in nearby riverine forest would provide strong circumstantial evidence for the movement of individuals.

While local records can provide much information, they cannot reveal the directions, distances or consistency of longer migrations. In view of the alternative possibilities outlined above, it is perhaps unjustified to assume that these follow the overall trends revealed by Elgood et al.'s (1973) analysis. For example, it seems incautious on the evidence available for Taylor & Macdonald (1978) to state for Phoeniculus purpureus that "there must be a considerable movement south in the late dry season", or for

Prionops plumata that "the entire population moves south". Unless coupled with detailed study of a species, or comparison of different localities, such firm statements may be premature, and are best avoided.

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